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STATEMENT OF AUTHORITY

This report has been prepared on behalf of RWE by Woodrow Sustainable Solutions Limited, part of the APEM Group (APEM Group Woodrow). Ornithological surveys at the location of the proposed Muingmore Wind Farm were conducted by appropriately experienced surveyors as listed below. This report has been written by Julieta Pedrana, reviewed by Maeve Maher-McWilliams.

Julieta is a Senior Ecologist with APEM Group Woodrow. She has completed a BSc in Biological Science at the University of Mar del Plata, Argentina and a PhD in Conservation Biology at the University of Southern Patagonia, Argentina. From 2017 to 2023, Julieta worked as a Senior Scientist researcher at the National Council of Scientific Research from Argentina at the Department of Environmental Science, National Technological University, Argentina. The main themes of her research have been the application of GIS-based modelling in nature conservation focusing on the predictive models for species occurrence and habitat suitability. She regularly carries out ornithological surveys and compiles ornithological reports, including carrying out Collision Risk Modelling to inform wind farm planning.

This report has been approved by Maeve Maher-McWilliams, Associate Director Ecologist with APEM Group Woodrow. Maeve is an experienced ecologist and has worked for over twelve years on complex environmental impact assessments and mitigation strategies for development projects across Ireland, Northern Ireland, and Scotland. Maeve has been involved in projects across several sectors such as renewable energy; linear infrastructure; flood relief schemes and port developments; tourism and recreation; residential, pharmaceutical and data centre developments. She is proficient in ecological impact assessment and Appropriate Assessment. Maeve's specialism is ornithology.

As required by Chartered Institute of Ecology and Environmental Management (CIEEM), all APEM Group Woodrow staff are required to abide by a strict code of professional conduct in all aspects of their work.

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1. OVERVIEW

Woodrow APEM Group (hereafter referred to as Woodrow) was commissioned by RWE to undertake ornithological survey work for the proposed Muingmore Wind Farm, Co. Mayo (hereafter referred to as the proposed development site). The proposed development site is for a 14-turbine wind farm, located in northwest Co. Mayo, north of Gweesalia and 1 km from Mullet/Blacksod Bay Complex Special Area of Conservation (SAC).

Survey work at the proposed development site commenced in April 2021. This report presents the methodologies and results of surveys undertaken at the proposed site between April 2021 and March 2024, and that comprise the Year 1, Year 2 and Year 3 surveys. Year 1 surveys were completed between April 2021 and March 2022, Year 2 surveys between April 2022 and March 2023 and Year 3 surveys between April 2023 and March 2024.

A summary of breeding season surveys undertaken included:

- Vantage point (VP) watches
- Breeding bird surveys including:
 - Lowland breeding wader surveys (O'Brien and Smith, 1992)
 - Dusk surveys for crepuscular species (Gilbert *et al.*, 1998)
- Breeding raptor surveys

A summary of non-breeding season surveys undertaken included:

- VP watches
- Winter walkover surveys
- Wintering waterbird surveys
- Hen harrier roost searches

This results report is a factual report which presents the survey methodologies and results from Year 1, Year 2 and Year 3 ornithological surveys and includes a discussion on the most sensitive ornithological findings. The report provides the baseline ornithological information required to inform the ornithological impact assessment for the proposed development, and will form a Technical Appendix to the Environmental Impact Assessment Report (EIAR).

2. DESK STUDY

An initial desk-based study of the proposed development site and wider area was compiled to determine the appropriate surveys required to inform any potential for ornithological constraints. A preliminary assessment of avian habitat suitability and availability was undertaken using ortho-imagery and six-inch mapping, which was viewed using Bing Maps, Google Earth Pro, Google Maps, and Ordnance Survey Ireland – GeoHive.

The National Parks and Wildlife Service (NPWS) Designations Viewer was used to identify the location of sites designated for nature conservation, specifically Special Protection Areas (SPAs) and the bird species, Special Conservation Interests (SCIs), for which these sites have been designated. EPA Maps was used to investigate hydrological connectivity to sites designated for nature conservation. SPAs occurring within an indicative distance of 15 km from (or with a hydrological connection to) the proposed development site are listed in Table 1 and Figure 1.

Table 1: SPAs and Special Areas of Conservation (SACs) within 15 km of the proposed development site

Designated site	Distance to the proposed development site	Qualifying Interests/Special Conservation Interests
Special Protection Areas (SPAs)		
Blacksod Bay/Broad Haven SPA (Site code: 004037)	c. 1 km west and south	Red-throated diver (<i>Gavia stellata</i>) [A001] Great Northern diver (<i>Gavia immer</i>) [A003] Slavonian grebe (<i>Podiceps auritus</i>) [A007] Light-bellied brent goose (<i>Branta bernicla hrota</i>) [A046] Common scoter (<i>Melanitta nigra</i>) [A065] Red-breasted merganser (<i>Mergus serrator</i>) [A069] Ringed plover (<i>Charadrius hiaticula</i>) [A137] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Sandwich tern (<i>Sterna sandvicensis</i>) [A191] Dunlin (<i>Calidris alpina schinzii</i>) [A466] Wetland and waterbirds [A999]
Carrowmore Lake SPA (Site code: 004052)	c. 6.5 km north-east	Sandwich tern (<i>Sterna sandvicensis</i>) [A191]
Owenduff/Nephin Complex SPA (Site code: 004098)	c. 7.5 km south-west	Merlin (<i>Falco columbarius</i>) [A098] Golden plover (<i>Pluvialis apricaria</i>) [A140]
Mullet Peninsula SPA (Site code: 004227)	c. 10.2 km north-west	Corncrake (<i>Crex crex</i>) [A122]
Doogort Machair SPA (Site code: 004235)	c. 11.5 km south-west	Dunlin (<i>Calidris alpina schinzii</i>) [A466]
Termoncarragh Lake and Annagh Machair SPA (Site code: 004093)	c. 13.3 km north-west	Whooper swan (<i>Cygnus cygnus</i>) [A038] Barnacle goose (<i>Branta leucopsis</i>) [A045] Corncrake (<i>Crex crex</i>) [A122] Lapwing (<i>Vanellus vanellus</i>) [A142] Chough (<i>Pyrrhocorax pyrrhocorax</i>) [A346] Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>) [A395] Dunlin (<i>Calidris alpina schinzii</i>) [A466] Wetland and waterbirds [A999]
Inishglora and Inishkeeragh SPA (Site code: 004084)	c. 14.5 km north-west	Storm petrel (<i>Hydrobates pelagicus</i>) [A014] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Shag (<i>Phalacrocorax aristotelis</i>) [A018] Barnacle goose (<i>Branta leucopsis</i>) [A045] Lesser black-backed gull (<i>Larus fuscus</i>) [A183] Herring gull (<i>Larus argentatus</i>) [A184] Arctic tern (<i>Sterna paradisaea</i>) [A194]
Special Areas of Conservation (SAC)		
Mullet/Blacksod Bay Complex SAC (Site code: 000470)	c. 1 km west	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]

Designated site	Distance to the proposed development site	Qualifying Interests/Special Conservation Interests
		Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Machairs (* in Ireland) [21A0] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150] Alkaline fens [7230] <i>Lutra lutra</i> (Otter) [1355] <i>Petalophyllum ralfsii</i> (Petalwort) [1395]
Carrowmore Lake Complex SAC (Site code: 000476)	c. 5.5 km north-east	Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the Rhynchosporion [7150] <i>Saxifraga hirculus</i> (Marsh Saxifrage) [1528] <i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]
Broadhaven Bay SAC (Site code: 000472)	c. 6.5 km north	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Submerged or partially submerged sea caves [8330]
Owenduff/Nephin Complex SAC (Site code: 000534)	c. 7.5 km south-west	Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Alpine and Boreal heaths [4060] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Saxifraga hirculus</i> (Marsh Saxifrage) [1528] <i>Hamatocaulis vernicosus</i> (Slender Green Feathermoss) [6216]
Doogort Machair/Lough Doo SAC (Site code: 001497)	c. 9 km south-west	Machairs (* in Ireland) [21A0] <i>Petalophyllum ralfsii</i> (Petalwort) [1395]
Slieve Fyagh Bog SAC (Site code: 000542)	c. 11 km north-east	Blanket bogs (* if active bog) [7130]
Erris Head SAC (Site code: 001501)	c. 11 km north-west	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Alpine and Boreal heaths [4060]
Croaghaun/Slievemore SAC (Site code: 001955)	c. 12.5 km south-west	Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030]

Designated site	Distance to the proposed development site	Qualifying Interests/Special Conservation Interests
		Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Siliceous rocky slopes with chasmophytic vegetation [8220]
West Connacht Coast SAC (Site code: 002998)	c. 12.7 km west	<i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]
Glenamoy Bog Complex SAC (Site code: 000500)	c. 14 km north-east	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Machairs (* in Ireland) [21A0] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the Rhynchosporion [7150] <i>Salmo salar</i> (Salmon) [1106] <i>Petalophyllum ralfsii</i> (Petalwort) [1395] <i>Saxifraga hirculus</i> (Marsh Saxifrage) [1528] <i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]

Bird records from the last ten years for the 10 km national grid square, F72, encompassing the proposed development site were collated from the National Biodiversity Data Centre (NBDC) database, using the report function on Biodiversity Maps¹ (Balmer *et al.*, 2013). Most of these records were based on the Bird Atlas 2007-11 (Balmer *et al.*, 2013). A full list of records and their current conservation status from *Birds of Conservation Concern in Ireland 2020-2026* (BoCCI) (Gilbert *et al.*, 2021) are listed in **Appendix I**. These records were reviewed to investigate target species potentially occurring within the proposed development site and wider area to inform survey design and identify any potential ornithological constraints. Target species generally focus on red and amber-listed BoCCI. Red-listed species are species of highest conservation concern where the population is rapidly declining in abundance or range, has experienced a historic rapid decline (without recovery) or is globally threatened. Amber-listed species are those with unfavourable European status, occur in internationally important numbers or are moderately declining in abundance or range. A species may also be amber-listed if a population occurs in very small numbers. These historical records and their conservation status (Gilbert *et al.*, 2021) are listed in **Appendix I**.

The NBDC mapping tool was also used to examine other relevant data sets including the BirdWatch Ireland bird sensitivity to wind energy layer as per Mc Guinness *et al.* (2015), though no data was found for the proposed development site.

¹ Available at <https://maps.biodiversityireland.ie/Map> (Accessed: March 2024)

Based on the Scottish Natural Heritage (SNH, 2017) guidelines, migratory populations of wintering geese and swans are considered to be notably sensitive to wind farm developments. As such, to characterise the distribution of these populations, data from recent population monitoring reports have been reviewed, and included:

- Boland and Crowe (2008), Lewis *et al.* (2019a) and Burke *et al.* (2022) for greylag goose *Anser anser* and pink-footed goose *Anser brachyrhynchus* distribution
- Burke *et al.* (2021) for whooper swan *Cygnus cygnus* distribution
- Fox *et al.* (2021) for Greenland white-fronted goose *Anser albifrons flavirostris* distribution.

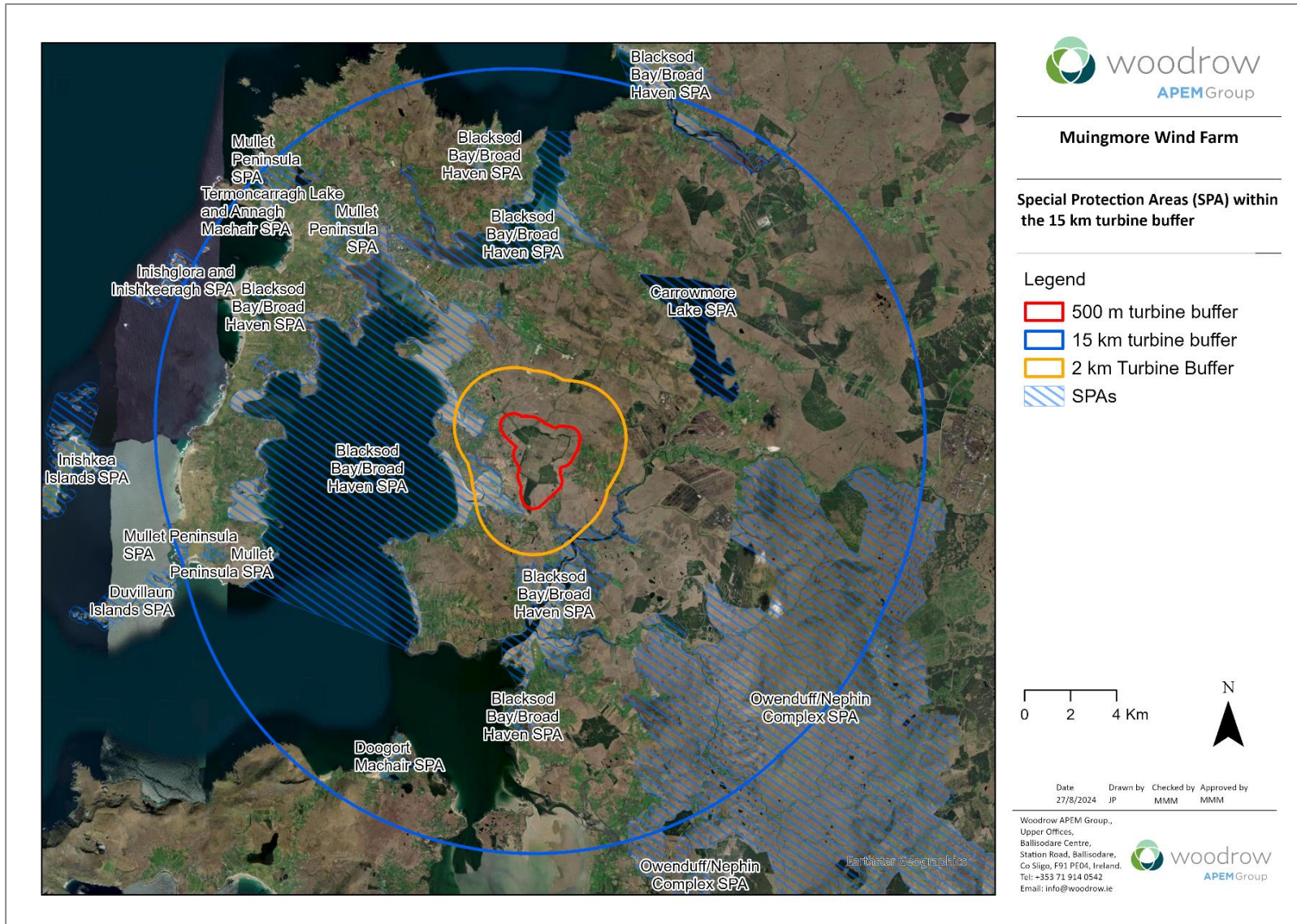


Figure 1: Special Protection Areas (SPAs) within the vicinity of the proposed development site

3. METHODOLOGY

Scottish Natural Heritage (SNH) (2017) guidelines provide recommended survey methodologies for the assessment of avian populations within and adjacent to proposed onshore wind farms. The survey methodologies utilised for ornithological surveys are outlined in the following sections and adhere to the relevant SNH guidance (SNH, 2017).

Two years of ornithological surveys are recommended by the SNH guidelines (SNH, 2017), unless it can be clearly demonstrated that a single year of data is sufficiently robust and appropriate for assessing the potential impacts of the proposal. For the proposed development, three years of ornithological surveys have been undertaken. This is to ensure there is no gap in data collection between the completion of surveys and the submission of a planning application.

3.1. VP watches

VP watches record flight line activity within the survey area, this is a 500 m buffer of the proposed turbine locations, to provide data on selected target species for assessing avian collision risk. Four

VPs were used to cover the proposed development site, and their locations are shown in



Figure 2.

Target species are those identified as being at risk from displacement effects caused by wind farm developments or from collision with turbines. Target species for which flightline data was captured were as follows:

- Waders and wildfowl (ducks, geese and swans)
- Other waterbirds (including grebes, herons, rails, crakes and gulls)
- Raptors and owls
- Any species listed on Annex I of the Birds Directive, and
- Any species listed as red on the BoCCI (Gilbert *et al.*, 2021).

VP watches involve the surveyor observing birds from a stationary position using binoculars and a telescope. In accordance with SNH guidelines (SNH, 2017), the viewshed of the VP is scanned at five-minute intervals. When a target species is seen, the surveyor estimates the height of the bird and its usage of the area by drawing its flight path on a map and noting its behaviour. Flight heights are estimated visually. Other data collected includes the number of birds, time of detection and duration

of flight, as well as sex and age class if determinable. A list of all non-target species encountered within the proposed development site is also compiled during watches, though priority is given to recording target species in the case of busier survey days. To limit observer fatigue, surveyors did not typically undertake VP watches of more than three hours in duration without a break, unless inclement periods of weather meant watches were paused for short durations until conditions improved.

The four selected VPs provide complete coverage (98.35%) of the 500 m turbine buffer of the proposed development, see **Appendix II** for the viewshed map. The VPs selected to cover this survey area are compliant with the SNH guidelines (SNH, 2017), which stipulate that viewsheds from VPs should not extend more than 2 km and that the angle of view should also not extend beyond an arc of 180 degrees. Based on viewsheds extending 2 km, some of the VP viewsheds overlap (see **Appendix II**). Given this overlap, it is acknowledged that the flight seconds reported cumulatively for all the VP watches will provide an overestimate of target species flight times. Conducting VP surveys simultaneously from VPs with overlapping viewsheds was avoided in order to avoid any duplicate records. In the rare case that VP watches were conducted simultaneously for VPs with overlapping viewsheds, surveyors would communicate with one another if a bird was seen flying to/from another viewshed so that the bird was recorded by only one surveyor at any one time. This overlap is also corrected in the collision risk modelling.

In compliance with SNH guidelines (SNH, 2017), for each VP a minimum of 36 hours of observation has been collected during the breeding season and non-breeding season, i.e. a minimum of 72 hours per VP per year. Survey hours completed at each VP location are provided in **Appendix III**.

In addition to the standard 36 hours of VP watches during the breeding and non-breeding seasons, an important consideration for the proposed development, given its location in the north-west of Ireland, is VP coverage during the spring (March to April) and autumn (September to October) passage seasons. Geese, swans and other waterfowl migrate to Ireland for the winter period arriving largely from Iceland, Greenland and Canada. For the Year 1 surveys at the proposed development site, investigative passage VP surveys were undertaken in September and October 2021 at each of the four VP locations lasting 1.5 hours each. In Year 2 and Year 3, a minimum of 18 hours of passage VP surveys were undertaken in the spring and autumn passage season at each of the four VP locations (See **Appendix III** for details). SNH guidelines (SNH, 2017) are not prescriptive on the number of hours required during the passage seasons but should be appropriate and adequate for the site and migration activity.

A summary of VP survey hours completed for each season is provided below.

Table 2: Number of VP watch survey hours during each season

Survey year	Season	VP1	VP2	VP3	VP4
Year 1	Breeding season 2021	38	36	36	36
	Autumn passage season 2021	4.5	4.5	4.5	4.5
	Non-breeding season 2021-22	36	38	36	36
Year 2	Breeding season 2022	36	36	39	36
	Autumn passage season 2022	18	18	18	18
	Non-breeding season 2022-23	36	36	36	36
	Spring passage season 2023	18	18.5	18	18
Year 3	Breeding season 2023	36	39	36	36

	Autumn passage season 2023	18	18	18	20.8
	Non-breeding season 2023-24	35.5	36	37	36
	Spring passage season 2024	21	18	18	18

3.2. Breeding bird surveys

The purpose of the breeding season walkovers, according to SNH guidelines (SNH, 2017), is to give a broad overview of bird activity in the survey area using a route which is representative of the important ornithological features and habitats present within the proposed development site (SNH, 2017). Breeding bird surveys aim to provide information on the distribution of breeding birds occurring within the proposed development site, highlighting the locations of potentially sensitive species which may present an ecological constraint. The survey area for breeding bird surveys included a 500 m buffer of the proposed turbine locations, shown at



Figure 2. Walkovers surveys employed a variety of survey techniques depending on the habitat suitability and target species likely to be present.

Lowland breeding wader surveys followed the survey technique by O'Brien and Smith (1992). A minimum of three visits were undertaken in each breeding season between April and June. One visit may comprise one survey which covers the entire survey area or a number of surveys covering different areas of the survey area undertaken over consecutive days. An exception to this was in Year 2, during the 2022 breeding season, where one visit was completed over three consecutive dates. This visit was however supplemented with four dusk visits. Surveyors walked open habitats occurring within the survey area which extended to covering suitable habitats within 800 m of the proposed turbine locations for breeding curlew *Numenius arquata*. During these walkover surveys, all other bird species encountered were also noted, along with their behaviour to indicate breeding status. Observations were recorded using the ESRI application Survey123.

To record crepuscular species, such as breeding snipe, surveys running from dawn to three hours after or from late afternoon to dusk were employed to increase the chances of detecting breeding behaviour, including chipping, or drumming snipe (O'Brien & Smith, 1992). As for the above walkover surveys, one visit may comprise one survey which covers the entire survey area or a number of surveys covering different areas of the survey area undertaken over consecutive days. One dusk visit was completed during the 2021 breeding season, three dusk visits were completed during the 2022 breeding season and five dusk visits were completed during the 2023 breeding season. During dusk surveys, surveyors also listened for other crepuscular and nocturnal species, including woodcock and owls.

A summary of breeding bird surveys completed for each season is provided below. Survey dates, times and weather conditions of the walkover and dusk survey is provided in **Appendix IV**.

Table 3: Breeding bird survey visits during each season

Survey year	Season	Survey type	Survey dates
Year 1	Breeding season 2021	Walkover	12/05/2021
		Walkover	17/05/2021
		Walkover	15/06/2021
		Dusk	28/06/2021
Year 2	Breeding season 2022	Walkover	24/06/2022
		Walkover	25/06/2022
		Walkover	26/06/2022
		Dusk	16/05/2022
		Dusk	02/06/2022, 06/06/2022
		Dusk	19/07/2022
Year 3	Breeding season 2023	Walkover	06/04/2023, 07/04/2023, 11/04/2023
		Walkover	06/05/2023, 07/05/2023, 08/05/2023
		Walkover	11/06/2023, 12/06/2023, 13/06/2023
		Walkover	20/06/2023
		Dusk	06/04/2023, 08/04/2023
		Dusk	05/05/2023, 06/05/2023, 08/05/2023
		Dusk	05/06/2023
		Dusk	10/06/2023
		Dusk	09/08/2023

3.3. Breeding raptor surveys

SNH guidelines (SNH, 2017) recommend surveying the wider area (hinterland) for up to 2 km from the proposed turbines for most breeding raptor species, including hen harrier *Circus cyaneus* and merlin *Falco columbarius*. This can be extended if the proposed development site lies within the potential zone of influence SPAs (SNH, 2016). In this instance, the proposed development site is not near any SPAs designated for raptors and the 2 km survey area was considered appropriate, see Figure 3.

A combination of mini-VPs, as well as driven and walked transects were used to search potential nesting habitats within the hinterland over the 2021, 2022 and 2023 breeding seasons. Survey methods for breeding raptors follow those outlined in Hardey *et al.* (2013). A total of two visits were carried out during the 2021 breeding season, one visit during the 2022 breeding season, and four visits during the 2023 breeding season. A summary of breeding raptor surveys completed for each season is provided below, and the survey dates, times and weather conditions are detailed in **Appendix V**.

Table 4: Breeding raptor survey visits during each season

Survey year	Season	Survey dates
Year 1	Breeding season 2021	31/05/2021
		01/06/2021
Year 2	Breeding season 2022	13/06/2022
Year 3	Breeding season 2023	28/03/2023
		09/04/2023, 10/04/2023
		11/06/2023, 12/06/2023, 13/06/2023, 14/06/2023
		11/07/2023

3.4. Winter walkover surveys

Winter walkover surveys aim to provide information on the distribution of birds wintering throughout the proposed development site and 500 m turbine buffer, highlighting the locations of sensitive species to be flagged as ecological constraints. Winter walkovers are important in providing context to VP watch data and facilitating validation of bird numbers utilising the proposed development site.

Winter walkovers of the proposed development site were undertaken during the Year 1 (non-breeding season 2021-22), Year 2 (non-breeding season 2022-23) and Year 3 (non-breeding season 2023-24) non-breeding seasons. Surveyors walked the survey area noting down all species encountered, ensuring to cover a sample of all habitats present. As such, winter walkovers provide useful information on the distribution of winter bird species within the proposed development site and how they are using each habitat type. A summary of breeding raptor surveys completed for each season is provided below, and the dates times and weather conditions are detailed in **Appendix VI**.

Table 5: Winter walkover survey visits during each season

Survey year	Season	Survey dates
Year 1	Non-breeding season 2021-22	28/10/2021, 31/10/2021
		11/01/2022, 12/01/2022

Survey year	Season	Survey dates
		23/02/2022, 28/02/2022
Year 2	Non-breeding season 2022-23	11/10/2022, 12/10/2022, 14/10/2022, 16/10/2022
		08/11/2022, 09/11/2022, 11/11/2022, 12/11/2022, 14/11/2022
		24/02/2023
Year 3	Non-breeding season 2023-24	15/10/2023, 16/10/2023
		07/11/2023, 08/11/2023
		11/01/2024, 18/01/2024

3.5. Wintering waterbird surveys

In assessing the impact of the proposed development site, it is important to provide contextual data on the numbers of waterbirds in the wider area relative to the usage of the proposed development site by these species. SNH guidelines (SNH, 2017) advise fortnightly monitoring of swan and geese foraging and roosting locations when occurring in the environs of the site (as detailed in Gilbert *et al.*, 1998), and specifically where SPAs are designated for these species. Survey areas of up to 500 m from the proposed development site for foraging locations and up to 6 km from the site for roost locations are recommended, although this may be extended where high levels of activity are anticipated (Figure 3).

In Ireland, swan and goose distribution is not well documented beyond designated sites. In addition, many wintering waterbirds occur outside of SPAs. As such, the number of survey visits undertaken was subject to the level of waterbird activity recorded within the proposed development and wider area. The surveys were based on the approach employed by BirdWatch Ireland’s Irish Wetland Bird Surveys (I-WeBS) and the survey area was extended up to 6 km from the proposed development to cover turloughs and loughs in the wider area which were considered suitable for foraging and roosting wintering waterbirds Figure 3.

SNH guidelines recommend that core foraging ranges of species should be examined to assess connectivity between the site and surrounding SPAs (SNH, 2016 and 2017). As detailed in Section 2, the closest SPA to the survey area is Blacksod Bay/Broad Haven SPA (site code: 004037), see Figure 1, which lies 1 km west. This site is of high ornithological importance for its excellent diversity of wintering waterbirds, including internationally important populations of great northern diver *Gavia immer* and light-bellied brent goose *Branta bernicla hrota*, and nationally important populations of nine other species. Of particular note is the usage of the site by over 20% of the all-Ireland populations of great northern diver and common scoter *Melanitta nigra*. It is also a nationally important breeding site for sandwich tern *Sterna sandvicensis* and dunlin *Calidris alpina*. Eight of the species that occur regularly are listed in Annex I of the EU Birds Directive, i.e. great northern diver, red-throated diver *Gavia stellata*, golden plover *Pluvialis apricaria*, bar-tailed godwit *Limosa lapponica*, sandwich tern, common tern *Sterna hirundo* and arctic tern *Sterna paradisaea*. Blacksod Bay and Broad Haven is a Ramsar Convention site.

To determine the density of use by wintering bird populations, and especially to identify any foraging or roosting sites for swans and geese, point count surveys (following those employed for I-

WebS) were undertaken to survey all publicly accessible/viewable bogs, ponds, canals, rivers and other wetland habitats within the wider area of the proposed wind farm, as shown at Figure 3.

A summary of wintering waterbird surveys completed for each season is provided below, and the dates times and weather conditions are detailed in **Appendix VII**. Surveys focussed on waterbirds, other target species, notably raptors, present during the surveys were also recorded.

Table 6: Wintering waterbird survey visits during each season

Survey year	Season	Survey dates
Year 1	Non-breeding season 2021-22	27/10/2021, 31/10/2021
		15/11/2021
		30/11/2021
		09/12/2021, 12/12/2021
		17/01/2022
		31/01/2022, 01/02/2022
		09/02/2022, 15/02/2022
17/03/2022		
Year 2	Non-breeding season 2022-23	15/10/2022
		12/11/2022, 17/11/2022
		06/12/2022, 08/12/2022, 09/12/2022, 11/12/2022
		21/01/2023, 22/01/2023, 25/01/2023
		20/02/2023, 23/02/2023
		04/03/2023, 06/03/2023
Year 3	Non-breeding season 2023-24	15/10/2023, 16/10/2023
		03/11/2023, 06/11/2023
		31/12/2023
		16/01/2024
		05/03/2024
		22/03/2024, 25/03/2024

3.6. Bioacoustic Monitoring

As mentioned under the VP watch methodology, the location of the proposed development site in the north-west of Ireland is an important consideration for the survey design to ensure surveys adequately cover migratory species. In addition, the proximity of Blacksod Bay/Broad Haven SPA and Carrowmore Lake SPA has been a consideration in determining the need for bioacoustic monitoring of night-time flights at the proposed development site. Due to these factors, it was deemed judicious to use bioacoustic monitoring equipment to supplement day-time VP watches which would not capture the occurrence of waterbird flights at night. Bioacoustic monitoring does not provide data on the abundance of species, however it does confirm the presence or absence of species.

In Year 2, two bioacoustic monitors, SongMeter-Minis, were deployed with an acoustic microphone set to record the bird calls. The deployment was made in the spring passage season between March and April 2023. In Year 3, three bioacoustic monitors were deployed during the spring passage season between February and April 2024. Monitoring was repeated at two locations with a third location added in Year 3. The bioacoustic monitor locations aimed to cover a geographical spread

across the survey area and to detect birds flying from the north, west and east where waterbodies and features potentially used by waterbirds exist in the wider area. The bioacoustic monitors were placed in open habitats to reduce any noise interference with trees or other structures. Detectors were set to record between 2 hours before sunset to 3 hours after sunset, and between 3 hours before sunrise to 2 hours after sunrise.

Table 7: Bioacoustic detector locations and deployment periods

Survey year	Season	Monitoring unit no.	Location	Deployment period
Year 2	Spring passage	WSS049	54.151324, -9.906162	13/03/2023-11/04/2023
		WSS045	54.136525, -9.892722	13/03/2023-11/04/2023
Year 3	Spring passage	WSS050	54.151324, -9.906162	13/02/2024 - 13/04/2024
		WSS042	54.136525, -9.892722	13/02/2024 - 13/04/2024
		WSS049	54.146473, -9.874215	13/02/2024 - 27/03/2024

Before analysis, sound classifiers were constructed for each target species (raptors and waterbirds), facilitating automated scanning of the data for calls specific to each species. Data analysis was undertaken by a suitably trained ecologist.

Across the two years of bioacoustic monitor there was a total of 1294hrs of sound data analysed using Kaleidoscope Pro. A cluster analysis was performed using the following settings for the target species: F(min) = 500Hz; F(max) = 5000Hz; Length(min) = 0.1s; Length(max) = 7.5s; and, Inter-syllable gap = 0.35s.

3.7. Hen harrier roost searches

SNH guidance (SNH, 2017) stipulates that surveying for communal raptor roosts, including those of hen harriers, roost sites within 2 km of a proposed development site should be identified (see Figure 3 for the survey areas).

With respect to the proposed development, the approach to surveying for hen harrier roosts was determined by two factors:

- Availability of potentially suitable roosting habitat in the vicinity of the proposed development, as described by Clarke and Watson (1990) and in the Irish national hen harrier winter roost survey guidelines (O'Donoghue, 2012 and 2019); and
- Hen harrier activity observed during VP watches, site walkovers and wider area surveys.

SNH (2017) defers to Hardey *et al.* (2013) for specific roost survey methodology, requiring surveyors to employ professional judgement in identifying and targeting potential roosts based on observed flight activity within or adjacent to the proposed development. Hardey *et al.* (2013) recommend locating birds in the late afternoon and then attempting to track them back to roosts. O'Donoghue (2019) notes that the best time to conduct a roost watch is at least 30 minutes before sunset until dark or 30 minutes before sunrise until at least 30 minutes after sunrise.

A total of four roost watches were carried out during the 2021-22 non-breeding season, 12 roost watches during the 2022-23 non-breeding season, and four during the 2023-24 non-breeding season. A summary of surveys completed for each season is provided below, and the dates, times and weather conditions are detailed in **Appendix VIII**.

Table 8: Hen harrier roost searches during each season

Survey year	Season	Survey dates
Year 1	Non-breeding season 2021-22	27/10/2021

Survey year	Season	Survey dates
		15/11/2021
		17/12/2021
		27/01/2022
Year 2	Non-breeding season 2022-23	12/10/2022
		14/10/2022
		19/10/2022
		09/11/2022
		13/11/2022
		14/11/2022
		21/01/2023
		29/01/2023
		30/01/2023
		23/02/2023
		02/03/2023
		05/03/2023
Year 3	Non-breeding season 2023-24	08/01/2024
		10/01/2024
		16/01/2024
		27/02/2024

3.8. Survey limitations

Survey limitations included the following:

- The number of breeding walkover and dusk surveys recommended by SNH (SNH, 2017) were not accomplished in the 2021 and 2022 breeding seasons
- The number of breeding raptor surveys recommended by SNH (SNH, 2017) were not accomplished in the 2021 and 2022 breeding seasons
- Access to the full ornithological survey area for walkover surveys could only be undertaken on lands where permission had been granted.
- During the Year 1 autumn passaging season, 4.5 hours per VP location were completed. These surveys were investigative to understand the usage of the area by migratory species. While SNH (2017) guidelines are not prescriptive, a greater survey effort will be undertaken in following passage seasons to gather more information.

Despite the limitations mentioned above, it is considered that the surveys carried out in Year 1, Year 2 and Year 3 provide sufficient data to identify any ornithological constraints and provide a robust data set for the purposed of an ornithological impact assessment for the proposed development.

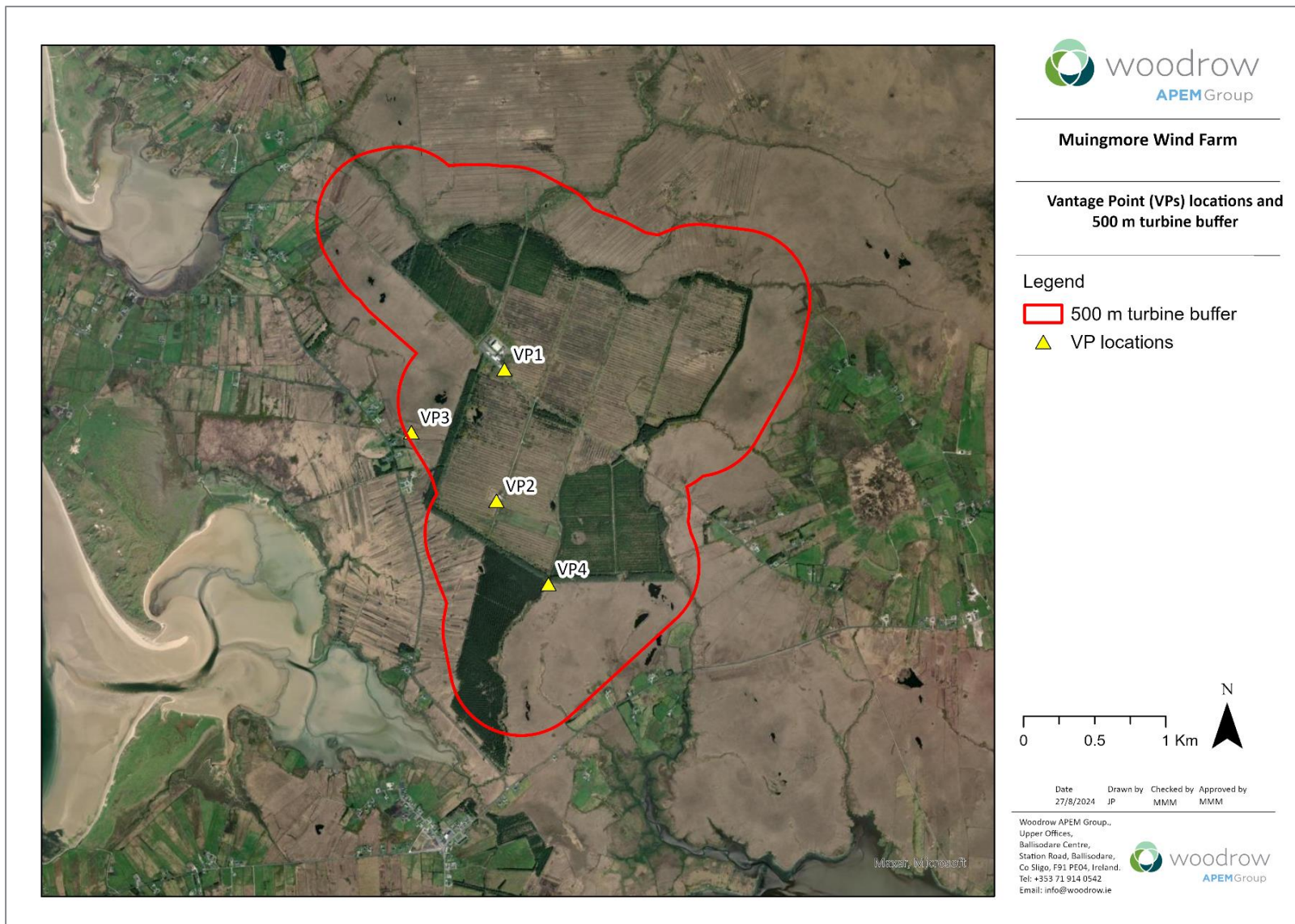


Figure 2: 500 m turbine buffer for VP watches, breeding bird surveys and winter walkover surveys

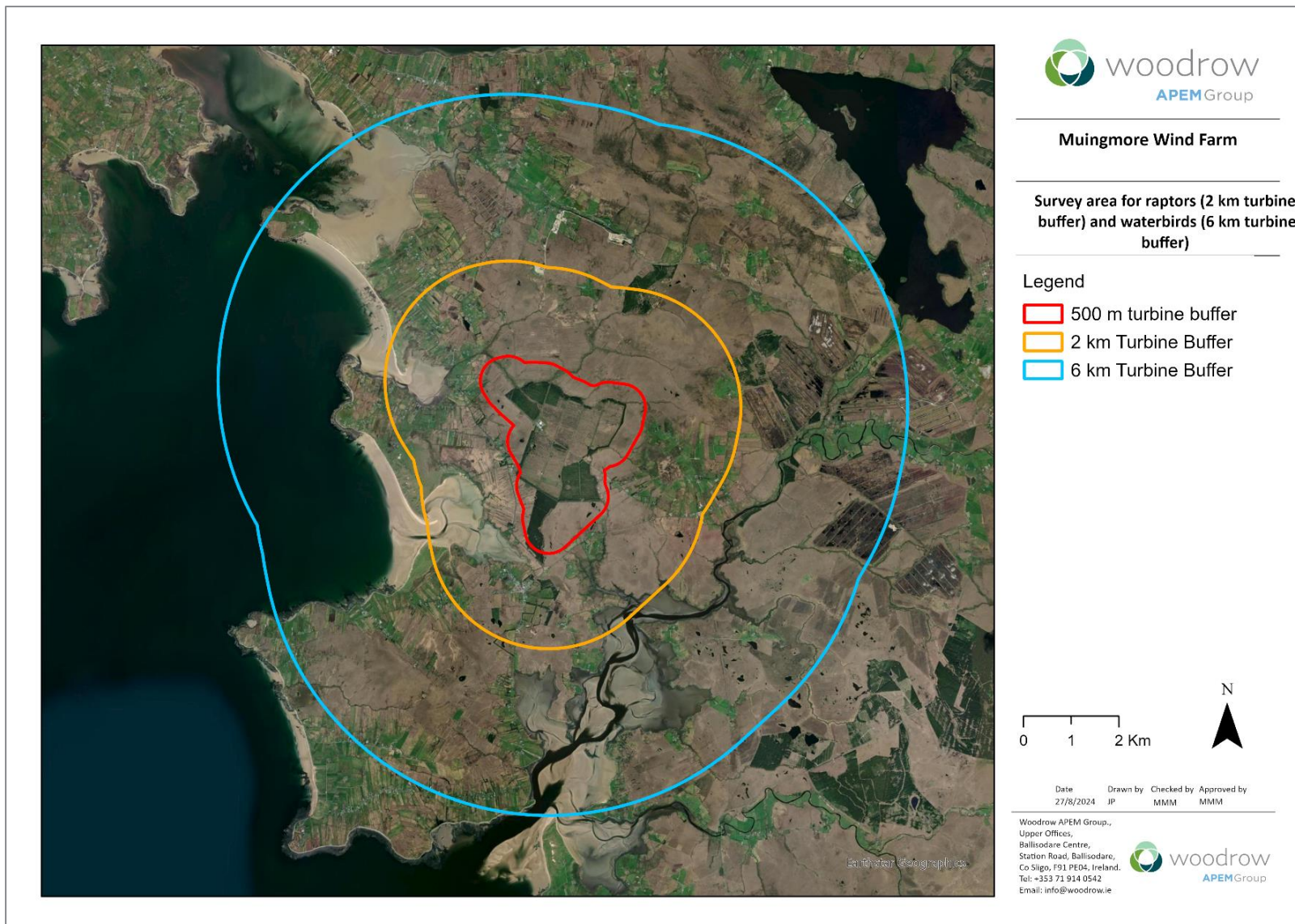


Figure 3: Survey area for breeding raptors and hen harrier roost searches (2 km turbine buffer) and for wintering waterbird surveys (6 km turbine buffer)

4. SURVEY RESULTS

4.1. VP watches

A total of 33 target species were recorded during VP watches over three years of surveys between April 2021 and March 2024. Flight times for target species recorded within the 500 m turbine buffer over three years of surveys are provided in

Table 9. Flightline maps are provided in **Appendix IX**, where individual flightlines shown on the maps can be cross-referenced via identification numbers to additional data on flight behaviour within attribute tables. To examine seasonal or annual variation in the occurrence of target species, the flight time data has been presented by the year:

- Year 1 - 2021 breeding season data (Table 10), 2021 autumn passage season data (Table 11), and 2021-22 non-breeding season data (Table 12)
- Year 2 - 2022 breeding season data (Table 13), 2022 autumn passage season data (Table 14), 2022-23 non-breeding season data (Table 15), and 2023 spring passage season data (Table 16)
- Year 3 - 2023 breeding season data (Table 17), the 2023 autumn passage season data (Table 18), 2023-24 non-breeding season data (Table 19) and 2024 spring passage season data (Table 20)

Flight time is split into time in different altitudinal levels to better understand the extent to which target species fly within the Collision Risk Zone (CRZ). The flight height range of the CRZ was defined as 10 to 150 m, a precautionary range based on the lowest minimum rotor swept height and highest tip height for the proposed turbine specifications.

A total of 11 species, which are highlighted in

Table 9, were identified as having flight times greater than 1,000 seconds within the CRZ. Generally, Collision Risk Modelling (CRM) is run for target species with a total aggregate flight time (i.e. number of individuals x flight time) of greater than 1,000 seconds within the CRZ, over a three-year study period. These species included:

- Four gull species (black-headed gull *Larus ridibundus*, great black-backed gull *Larus marinus*, herring gull *Larus argentatus*, and lesser black-backed gull *Larus fuscus*)
- Three raptor species (buzzard *Buteo buteo*, kestrel *Falco tinnunculus*, and sparrowhawk *Accipiter nisus*)
- Two wader species (snipe *Gallinago gallinago* and Wilson's phalarope *Phalaropus tricolor*), and
- Two other waterbird species (grey heron *Ardea cinerea* and greylag goose).

Table 9: Overall target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer between April 2021 and May 2024

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	3	71	2,852	3,537	-	6,389
Buzzard	2	9	-	741	310-	1,051
Canada goose	1	1	-	50	-	50
Common gull	2	6	-	699	-	699

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Common tern	1	2	-	54	-	54
Cormorant	1	5	-	510	-	510
Curlew	2	1	-	-	-	-
Golden plover	3	1	-	36	-	36
Great black-backed gull	4	65	9	6,654	-	6,663
Greenshank	1	1	-	20	-	20
Grey heron	3	36	421	1,105	300	1,826
Greylag goose	17	1	-	4,335	-	4,335
Gull sp.	4	8	-	443	-	443
Hen harrier	1	9	850	265	-	1115
Herring gull	5	64	23	2,650	-	2,673
Hobby	1	3	50	240	-	290
Kestrel	4	192	864	14,977	2,060	17,901
Kittiwake	1	1	-	40	-	40
Lapwing	3	1	-	222	-	222
Lesser black-backed gull	5	91	306	8,452	-	8,758
Mallard	4	25	107	1070	-	1,177
Meadow pipit	7	7	70	78	-	148
Merlin	1	5	88	26	-	114
Mistle thrush	6	1	-	210	-	210
Peregrine	1	11	-	465	-	465
Pheasant	1	2	22	-	-	22
Raptor Sp.	1	1	-	30	-	30
Snipe	27	22	5	2,153	-	2,158
Sparrowhawk	2	80	756	5,588	-	6,359
Swift	1	1	-	12	-	12
Teal	5	3	40	87	-	127
Whimbrel	7	1	-	-	945	945
Whooper swan	5	3	-	1,125	-	1,125
Wilson's phalarope	18	1	-	1,080	-	1,080
Woodcock	1	4	14	21	-	35

Table 10: 2021 breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	2	47	332	2,087	-	2,419
Buzzard	1	1	-	53	-	53
Common gull	2	1	-	580	-	580
Great black-backed gull	1	11	-	765	-	765
Grey heron	1	7	119	143	-	262
Herring gull	2	16	-	576	-	576
Kestrel	2	48	430	3,349	-	3,779

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Lesser black-backed gull	3	53	171	2,856	-	3,027
Mallard	1	4	44	46	-	90
Pheasant	1	1	12	-	-	12
Sparrowhawk	1	1	14	-	-	14
Teal	1	1	-	12	-	12

Table 11: 2021 autumn passage season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Kestrel	1	1	-	134	-	134
Pheasant	1	1	10	-	-	10
Sparrowhawk	2	13	393	1,328	-	1,721

Table 12: 2021-22 non-breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Great black-backed gull	2	10	-	490	-	490
Grey heron	3	6	47	244	-	291
Kestrel	1	15	-	470	-	470
Lapwing	3	1	-	222	-	222
Merlin	1	1	-	26	-	26
Snipe	1	5	5	45	-	50
Sparrowhawk	2	23	15	963	-	978
Whooper swan	3	1	-	120	-	120
Woodcock	1	4	14	21	-	35

Table 13: 2022 breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	3	6	-	510	-	510
Buzzard	2	6	-	938	-	938
Common tern	1	2	-	54	-	54
Great black-backed gull	2	10	-	360	-	360
Grey heron	1	7	10	180	180	370
Gull Sp.	4	7	-	418	-	418
Hen harrier	1	2	-	225	-	225
Herring gull	2	29	23	813	-	836
Hobby	1	3	50	240	-	290
Kestrel	4	32	-	5,632	700	6,332
Lesser black-backed gull	2	10	45	522	-	567
Mallard	2	8	-	278	-	278

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Meadow pipit	7	3	70	10	-	80
Raptor sp.	1	1	-	30	-	30
Sparrowhawk	1	1	-	30	-	30

Table 14: 2022 autumn passage season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	2	2	-	75	-	75
Cormorant	1	3	-	230	-	230
Curlew	2	1	-	-	-	-
Great black-backed gull	1	1	-	270	-	270
Grey heron	1	1	-	120	-	120
Herring gull	1	2	-	135	-	135
Kestrel	2	7	345	200	-	545
Peregrine	1	4	-	245	-	245
Snipe	27	4	-	1,475	-	1,475
Sparrowhawk	2	3	35	175	-	210

Table 15: 2022-23 non-breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	1	1	-	25	-	25
Buzzard	1	2	-	60	-	60
Common gull	2	2	-	-	-	-
Cormorant	1	1	-	165	-	165
Great black-backed gull	3	8	-	1,985	-	1,985
Greenshank	1	1	-	20	-	20
Grey heron	1	2	120	40	-	160
Hen harrier	1	3	450	40	-	490
Kestrel	2	8	55	1,010	-	1,065
Lesser black-backed gull	2	1	-	250	-	250
Mallard	4	2	45	40	-	85
Merlin	1	1	30	-	-	30
Peregrine	1	4	-	145	-	145
Snipe	2	4	-	365	-	365
Sparrowhawk	2	12	110	1,575	-	1,685
Whooper swan	5	1	-	875	-	875
Wilson's phalarope	18	1	-	1,080	-	1,080

Table 16: 2023 spring passage season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Cormorant	1	1	-	115	-	115
Great black-backed gull	4	10	-	1,484	-	1,484
Grey heron	1	6	125	215	-	340
Greylag goose	17	1	-	4,335	-	4,335
Hen harrier	1	1	160	-	-	160
Herring gull	1	2	-	95	-	95
Kestrel	2	12	-	760	-	760
Kittiwake	1	1	-	40	-	40
Lesser black-backed gull	3	2	90	75	-	165
Mallard	4	2	10	400	-	410
Merlin	1	2	23	-	-	23
Sparrowhawk	1	6	85	1,125	-	1,210
Teal	2	1	40	-	-	40

Table 17: 2023 breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10- 150 m	C >150 m	Total
Black-headed gull	2	13	2,520	696	-	3,216
Canada goose	1	1	-	50	-	50
Common gull	1	2	-	109	-	109
Golden plover	3	1	-	36	-	36
Great black-backed gull	2	10	-	1,025	-	1,025
Grey heron	1	2	-	45	-	45
Gull Sp.	1	1	-	25	-	25
Herring gull	5	12	-	891	-	891
Kestrel	2	39	-	3,474	-	3,474
Lesser black-backed gull	2	10	-	1,608	-	1,608
Mallard	2	2	-	40	-	40
Meadow pipit	4	4	-	68	-	68
Mistle thrush	6	1	-	210	-	210
Snipe	2	7	-	200	-	200
Sparrowhawk	1	13	60	200	-	260
Swift	1	1	-	12	-	12
Teal	5	1	-	75	-	75
Whimbrel	7	1	-	-	945	945

Table 18: 2023 autumn passage season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	1	1	-	20	-	20
Grey heron	1	1	-	15	-	15
Hen harrier	1	1	40	-	-	40

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Herring gull	1	2	-	95	-	95
Kestrel	1	5	5	105	-	110
Lesser black-backed gull	1	4	-	350	-	350
Snipe	2	2	-	68	-	68
Sparrowhawk	1	1	15	-	-	15

Table 19: 2023-24 non-breeding season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Common gull	1	1	-	10	-	10
Great black-backed gull	2	3	-	275	-	275
Hen harrier	1	1	20	-	-	20
Kestrel	2	6	-	340	-	340
Lesser black-backed gull	1	1	-	30	-	30
Mallard	2	1	-	60	-	60
Merlin	1	1	35	-	-	35
Sparrowhawk	1	2	15	-	-	15

Table 20: 2024 spring passage season target species flight time, number of flights and the maximum number of individuals observed at any one time within the 500 m turbine buffer

Target species	Max no. birds	No. observations	Flight time (seconds) in height bands			
			A 0-10 m	B 10-150 m	C >150 m	Total
Black-headed gull	1	1	-	124	-	124
Great black-backed gull	1	2	9	-	-	9
Grey heron	1	4	-	223	-	223
Hen harrier	1	1	180	-	-	180
Herring gull	1	1	-	45	-	45
Kestrel	2	19	29	863	-	892
Lesser black-backed gull	5	10	-	2,761	-	2,761
Mallard	4	6	8	206	-	214
Peregrine	1	3	-	75	-	75
Sparrowhawk	1	5	29	192	-	221
Whooper swan	1	1	-	130	-	130

4.2. Breeding bird surveys

4.2.1. Breeding season 2021

Breeding bird walkovers including dusk surveys covering the proposed development site were undertaken between May and June 2021. A total of 38 different bird species were recorded during these surveys. Table 21 lists red and amber-listed species recorded, the number of individuals recorded and their breeding status within the 500 m turbine buffer. Figure 4 and Figure 5 show the

locations of red and amber-listed birds recorded during the 2021 breeding season, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix X**.

Table 21: Summary of breeding bird walkover and dusk surveys carried out during the 2021 breeding season

Species	BTO code	No. individuals			BoCCI 2020-2026	Breeding status within 500 m turbine buffer
		Visit 1	Visit 2	Visit 3		
Kestrel	K	2	1	-	Red	A breeding pair of kestrels has been confirmed within the existing buildings in the central area of the site
Meadow pipit	MP	-	-	30	Red	Breeding in suitable habitats within the 500 m turbine buffer
Snipe	SN	2	1	-	Red	Snipe were recorded chipping and drumming to the north-west and south-east of the 500 m turbine buffer
Black-headed gull	BH	-	-	4	Amber	Not breeding within the 500 m turbine buffer
Goldcrest	GC	-	4	2	Amber	Breeding in suitable forestry habitat within the 500 m turbine buffer
Lesser black-backed gull	LB	1	5	-	Amber	Five observations were recorded in the central part of the site. One potential breeding territory within the 500 m turbine buffer
Mallard	MA	5	-	-	Amber	Likely breeding in a small waterbody in the west within the 500 m turbine buffer
Skylark	S	-	2	2	Amber	Breeding in suitable habitat within the 500 m turbine buffer
Starling	SG	2	-	-	Amber	One observation recorded near the buildings located in the central part of the site
Swallow	SL	2	3	-	Amber	Two observations were recorded in the north and central parts of the 500 m turbine buffer. Likely to breed in the north of the site where suitable habitats are present, although no nesting site is located
Teal	T	1	2	-	Amber	Two observations were recorded one in a small waterbody in the west and another in a small waterbody in the south within the 500 m turbine buffer. No breeding site was located
Willow warbler	WW	2	13	14	Amber	Breeding in suitable woodland and scrub habitat within the 500 m turbine buffer and wider area

4.2.2. Breeding season 2022

A total of 27 different bird species were recorded during the 2022 breeding bird surveys. Table 22 lists the species, the number of individuals recorded on each visit and the BoCCI conservation status following Gilbert *et al.* (2021). The breeding status of each species within the 500 m turbine buffer is also provided in this table. Figure 6 and Figure 7 show the locations of red and amber-listed birds recorded during the 2022 breeding bird surveys, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix X**.

Table 22: Summary of breeding bird walkover and dusk surveys carried out during the 2022 breeding season

Species	BTO code	No. individuals	BoCCI 2020-2026	Breeding status within 500 m turbine buffer
		Visit 1		
Kestrel	K.	2	Red	A breeding pair of kestrel was confirmed in the central area of the site, as it was recorded in the previous breeding season
Meadow pipit	MP	45	Red	Breeding in suitable habitat within the 500 m turbine buffer
Snipe	SN	1	Red	Snipe were recorded chipping and drumming to the south-east of the 500 m turbine buffer
Black-headed gull	BH	6	Amber	Not breeding within the 500 m turbine buffer
Herring gull	HG	1	Amber	Not breeding within the 500 m turbine buffer
Lesser black-backed gull	LB	1	Amber	Not breeding within the 500 m turbine buffer
Skylark	S.	4	Amber	Breeding in suitable habitat within the 500 m turbine buffer
Starling	SG	12	Amber	One observation with 12 individuals was recorded in the north-east side of the site. No breeding behaviour was recorded
Swallow	SL	12	Amber	One observation with 12 individuals was recorded in the central part of the site. No breeding site was located
Willow warbler	WW	12	Amber	Breeding in suitable woodland and scrub habitat within the 500 m turbine buffer and wider area

4.2.3. Breeding season 2023

A total of 41 different bird species were recorded during the 2023 breeding bird surveys. Table 23 lists the species, the number of individuals recorded on each visit and the BoCCI conservation status following Gilbert *et al.* (2021). The breeding status of each species within the 500 m turbine buffer is also provided in this table. Figure 8 and Figure 9 show the locations of red and amber-listed birds recorded during the 2023 breeding bird surveys, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix X**.

Table 23: Summary of breeding bird walkover and dusk surveys carried out during the 2023 breeding season

Species	BTO code	No. individuals				BoCCI 2020-2026	Breeding status within 500m turbine buffer
		Visit 1	Visit 2	Visit 3	Visit 4		
Kestrel	K.	-	-	4	-	Red	A breeding pair of kestrel was confirmed in the central area of the site, as it was recorded in the two previous breeding seasons
Meadow pipit	MP	56	26	38	18	Red	Breeding in suitable habitat within the 500 m turbine buffer
Snipe	SN	11	1	-	3	Red	Snipe were recorded chipping and drumming to south-east of the 500 m turbine buffer
Goldcrest	GC	19	28	28	8	Amber	Breeding in suitable forestry habitat within the 500 m turbine buffer, which is consistent with breeding territory locations recorded during the 2021 breeding season
House sparrow	HS	-	2	-	-	Amber	One observation with two individuals was recorded. No breeding behaviour was noted
Linnet	LI	-	-	2	-	Amber	One observation with two individuals was recorded. No breeding behaviour was noted
Mallard	MA	5	-	1	-	Amber	All flying individuals. No breeding site was recorded
Sand martin	SM	-	2	-	-	Amber	A couple was recorded feeding in a pasture in the north-west of the site. No breeding colonies were located
Skylark	S.	12	26	24	4	Amber	Breeding in suitable habitat within the 500 m turbine buffer
Starling	SG	6	-	-	-	Amber	Two observations with 6 and 4 individuals were recorded in the central part of the site. No breeding behaviour was recorded
Swallow	SL	2	18	7	3	Amber	Likely breeding in suitable structures in the central part of the site within the 500 m turbine buffer and wider area
Teal	T.	2	-	1	-	Amber	Two observations were recorded in a small waterbody in the south within the 500 m turbine buffer. No breeding site was located
Willow warbler	WW	25	53	48	4	Amber	Breeding in suitable woodland and scrub habitat within the 500 m turbine buffer and wider area

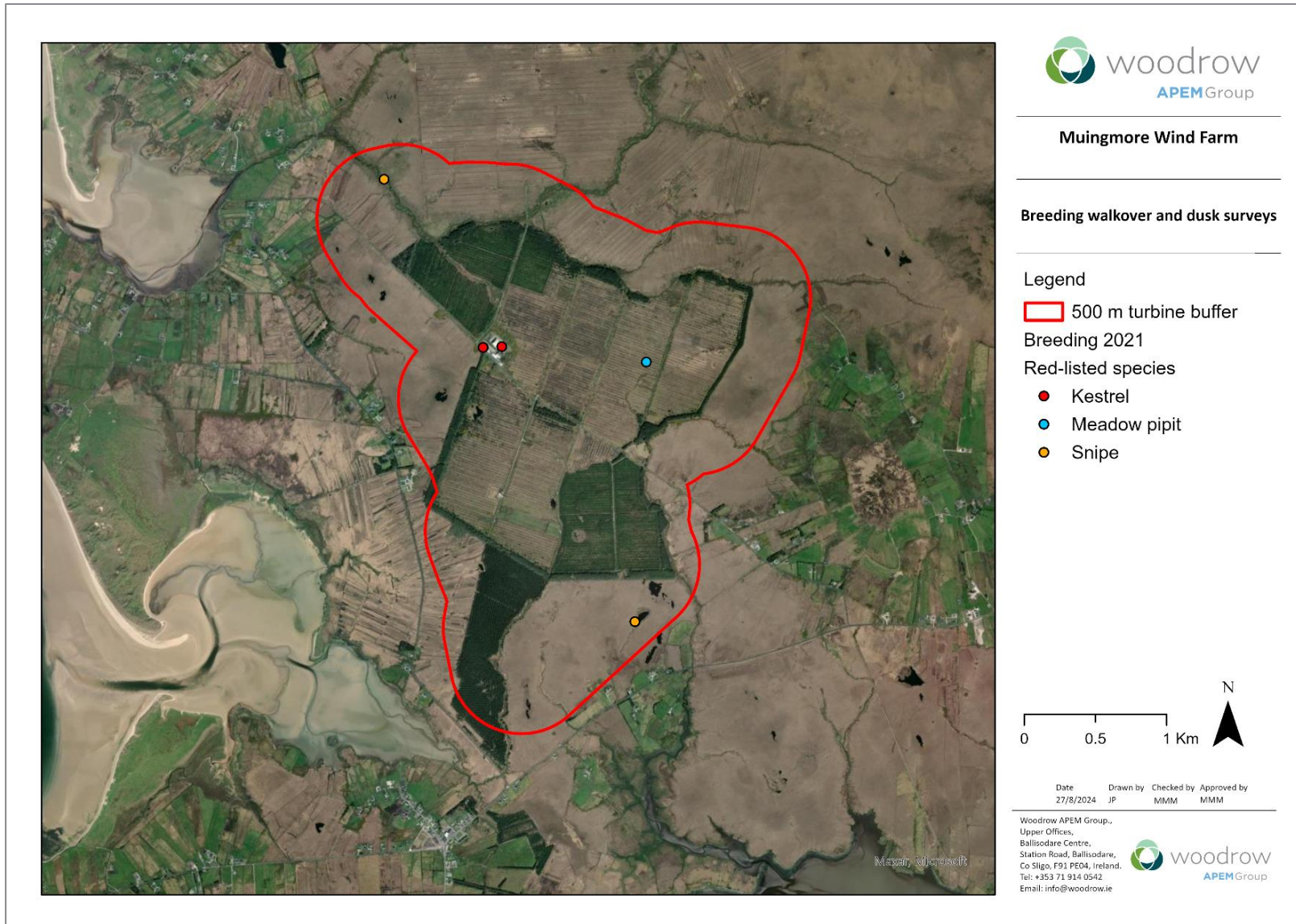


Figure 4: Red-listed species recorded during the 2021 breeding bird surveys within 500 m turbine buffer

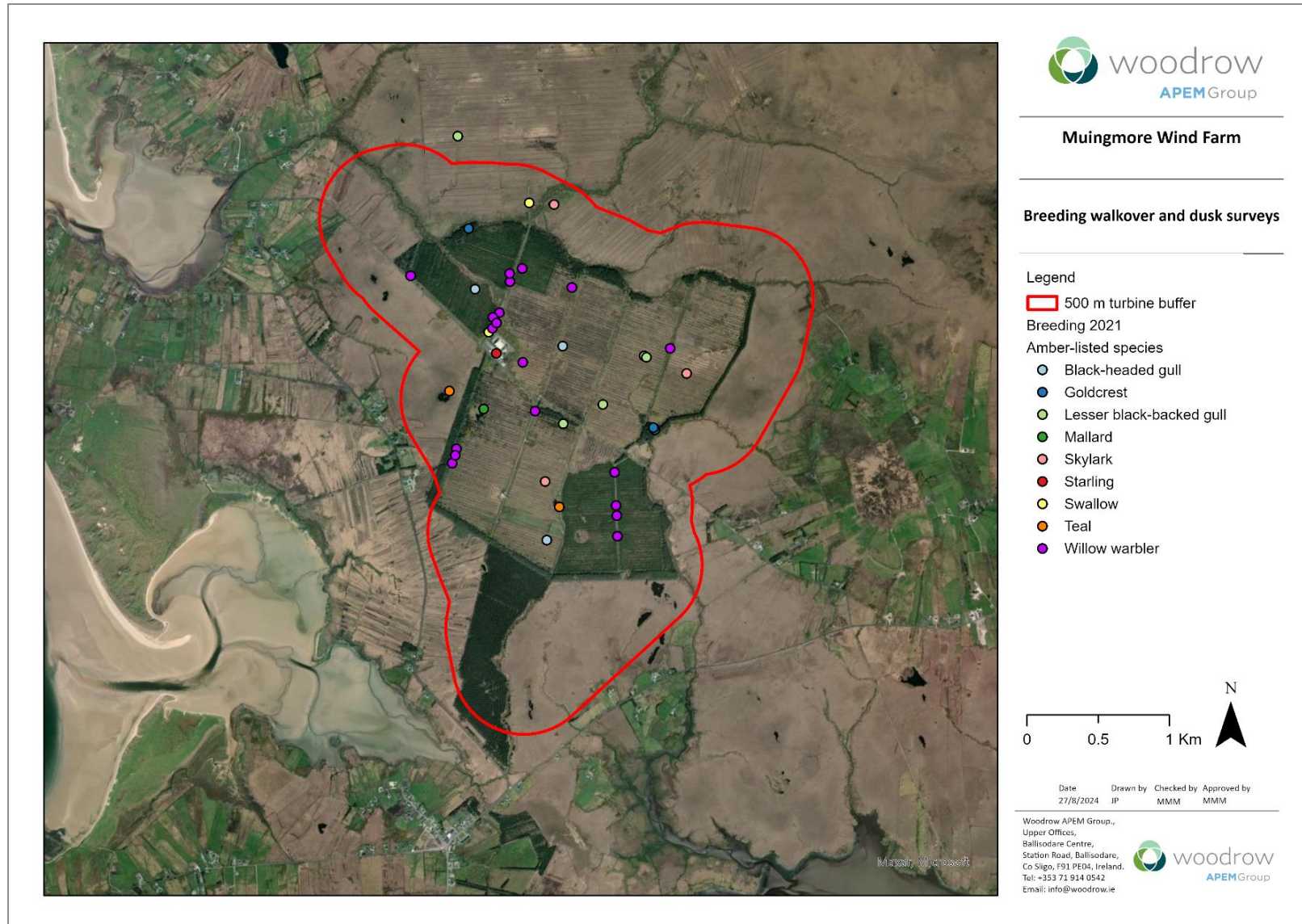


Figure 5: Amber-listed species recorded during the 2021 breeding bird surveys within 500 m turbine buffer

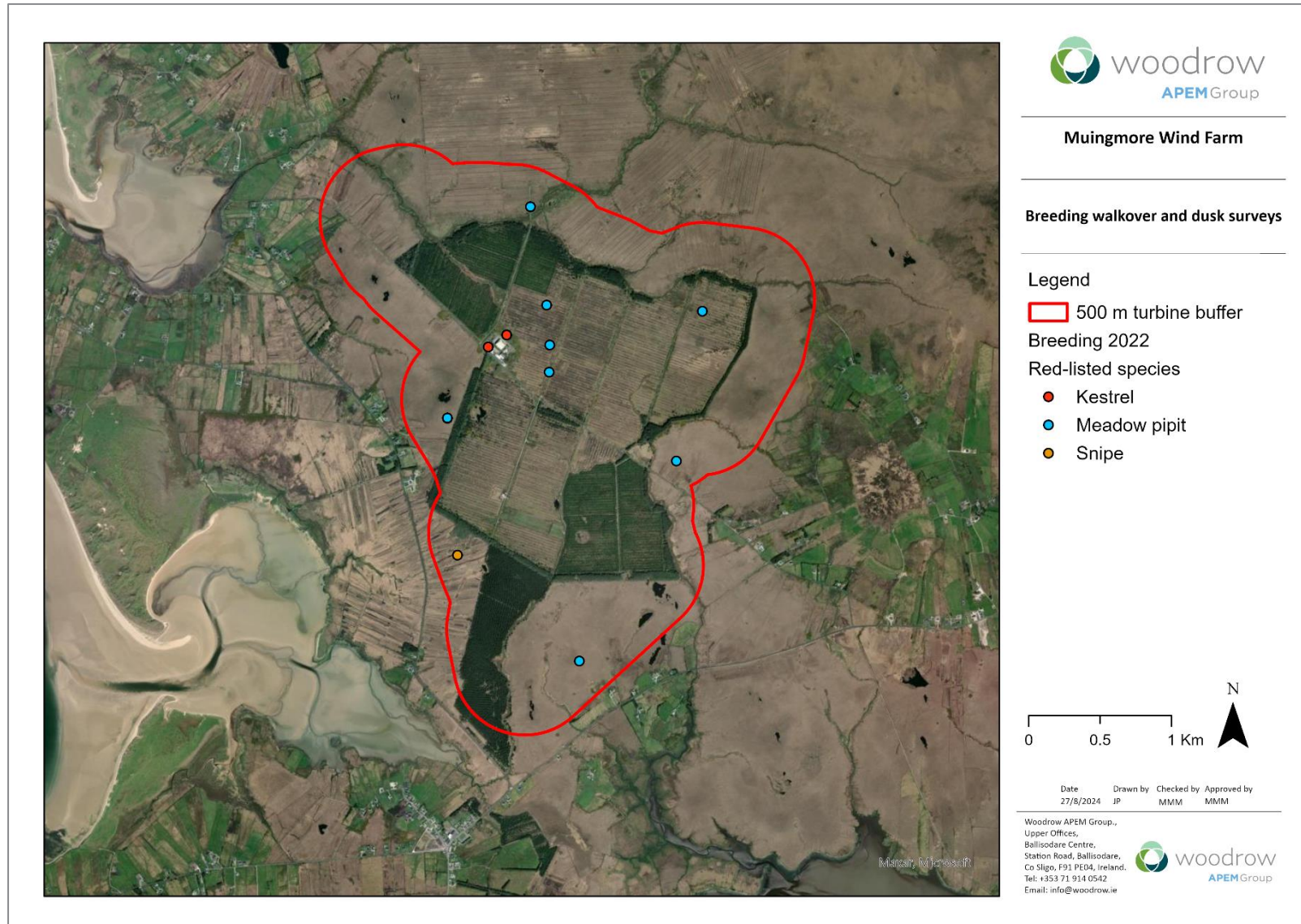


Figure 6: Red-listed species recorded during the 2022 breeding bird surveys within 500 m turbine buffer

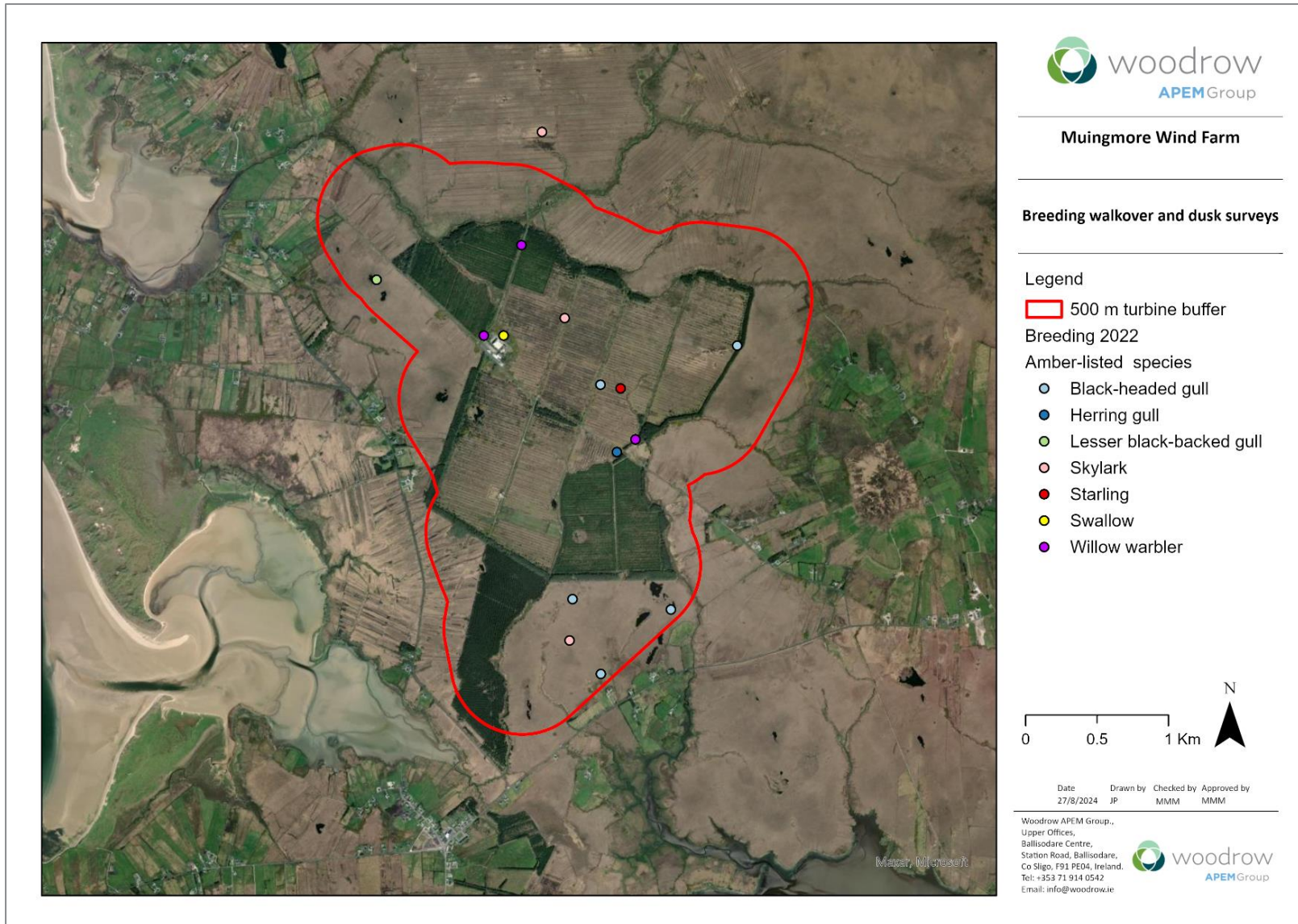


Figure 7: Amber-listed species recorded during the 2022 breeding bird surveys within 500 m turbine buffer

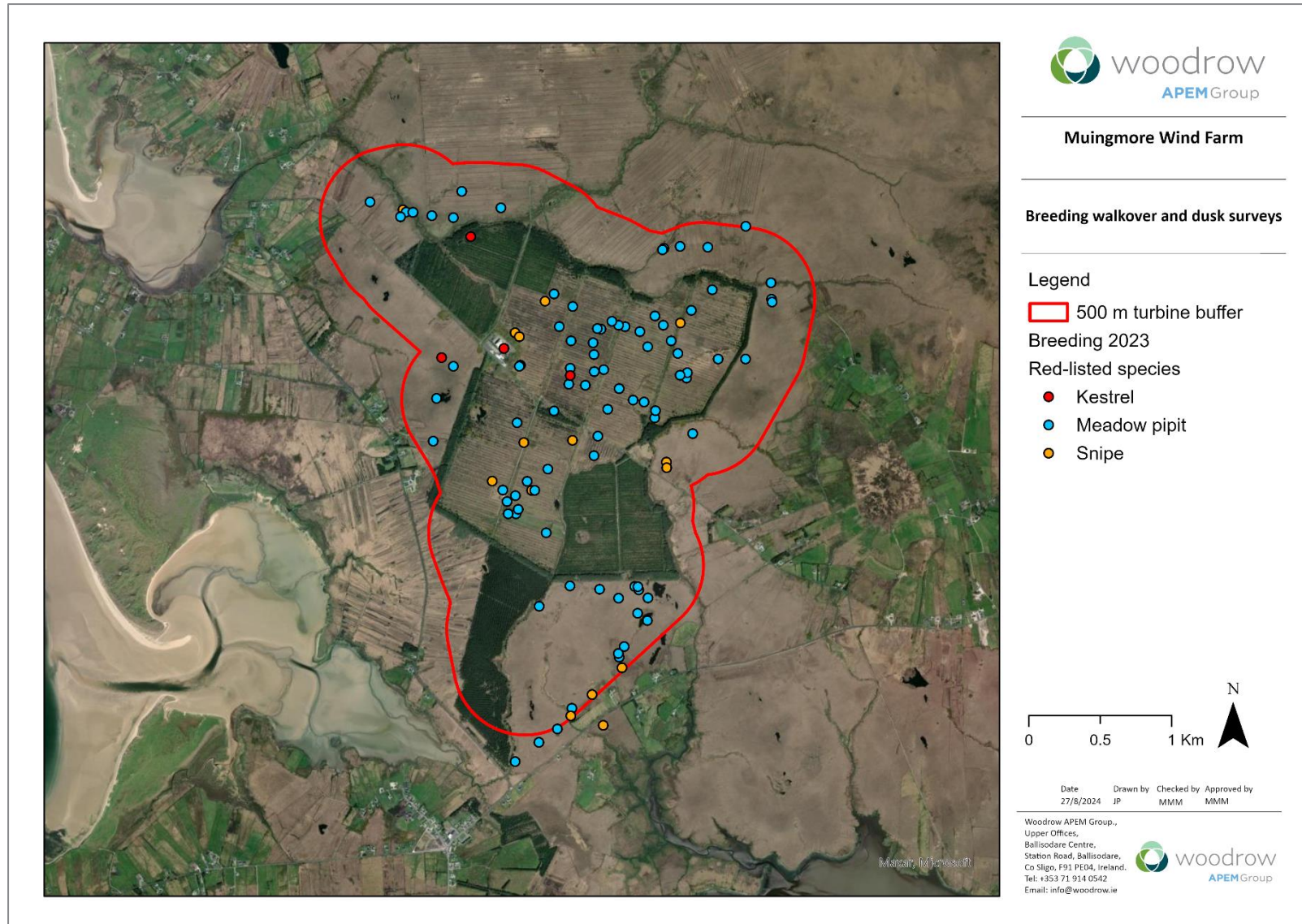


Figure 8: Red-listed species recorded during the 2023 breeding bird surveys within 500 m turbine buffer

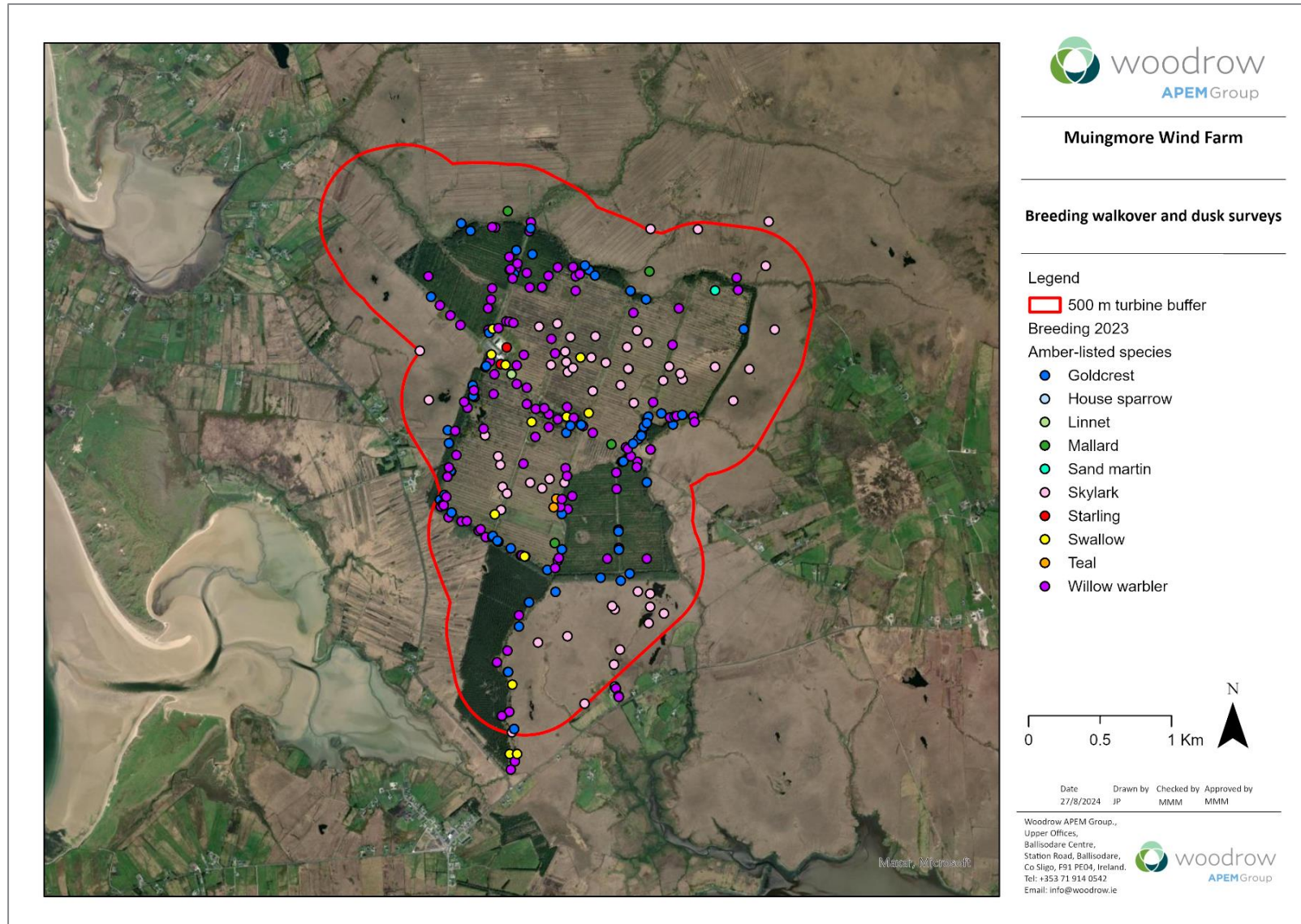


Figure 9: Amber-listed species recorded during the 2023 breeding bird surveys within 500 m turbine buffer

4.3. Breeding raptor surveys

Table 24, Table 25 and Table 26 show the number of raptor observations recorded during each breeding raptor survey date in the wider area for the 2021, 2022 and 2023 breeding seasons, respectively. The breeding status of each species within the 500 m turbine buffer is also provided in these tables. Figure 10, Figure 11 and Figure 12 show the locations of raptor species recorded during the 2021, 2022, and 2023 breeding raptor surveys, respectively.

No hen harrier, peregrine or merlin were recorded during the breeding raptor surveys within the 2 km turbine buffer. A breeding pair of kestrel have nested within the existing buildings in the central area of the site during the 2021, 2022 and 2023 breeding seasons.

Table 24: Summary of breeding raptor survey results for the 2021 breeding season

Species	BTO code	No. individuals		BoCCI 2020-2026	Breeding status within 500m turbine buffer
		Visit 1	Visit 2		
Kestrel	K.	1	8	Red	A breeding pair of kestrel was confirmed in the central area of the site

Table 25: Summary of breeding raptor survey results for the 2022 breeding season

Species	BTO code	No. individuals	BoCCI 2020-2026	Breeding status within 500m turbine buffer
		Visit 1		
Kestrel	K.	4	Red	A breeding pair of kestrel was confirmed in the central area of the site, as it was recorded in the previous breeding season

Table 26: Summary of breeding raptor survey results for the 2023 breeding season

Species	BTO code	No. individuals				BoCCI 2020-2026	Breeding status within 500m turbine buffer
		Visit 1	Visit 2	Visit 3	Visit 4		
Kestrel	K.	1	-	2	5	Red	A breeding pair of kestrel was confirmed in the central area of the site, as it was recorded in the two previous breeding seasons

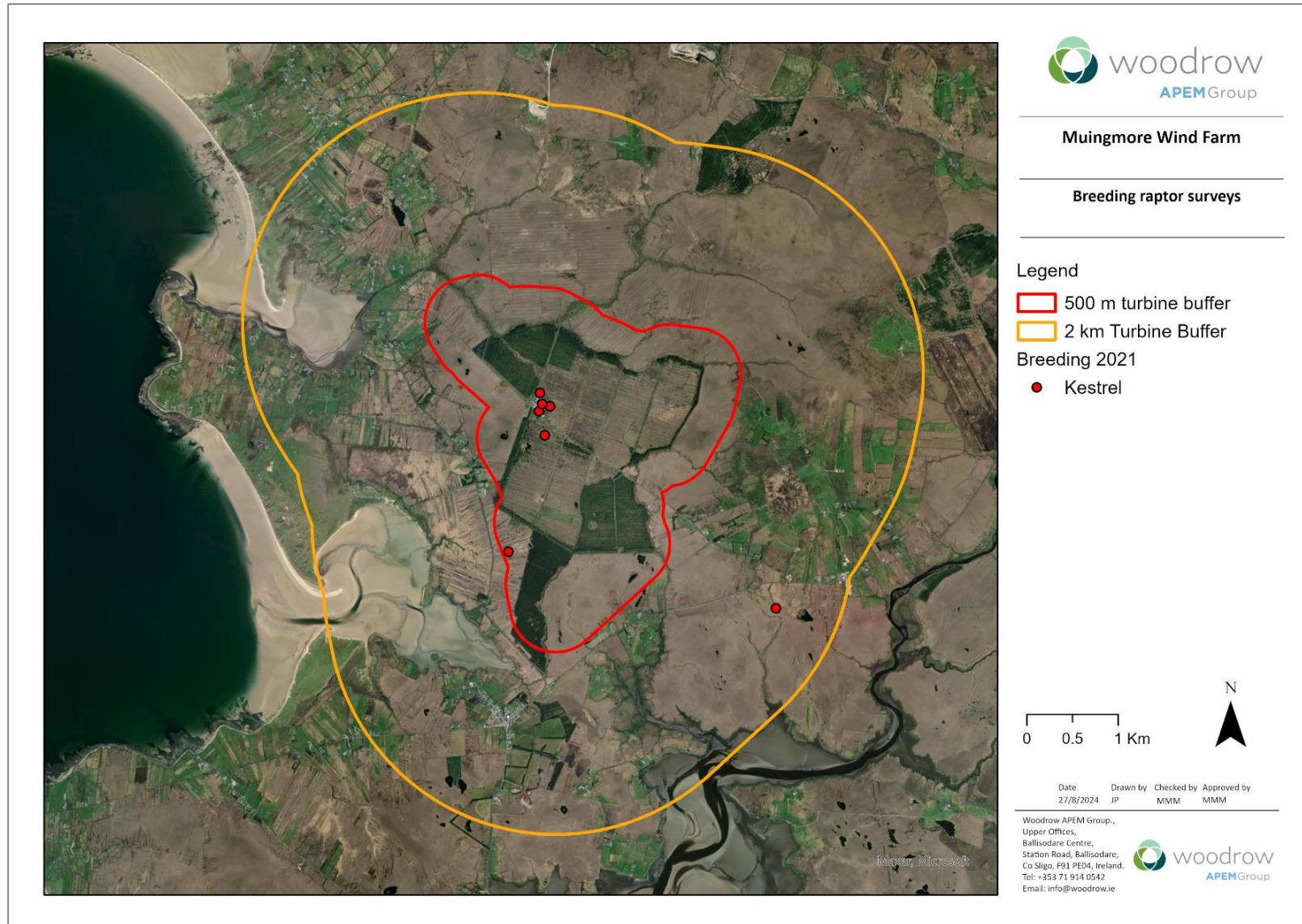


Figure 10: Raptor species recorded during the 2021 breeding raptor bird surveys within 2 km turbine buffer

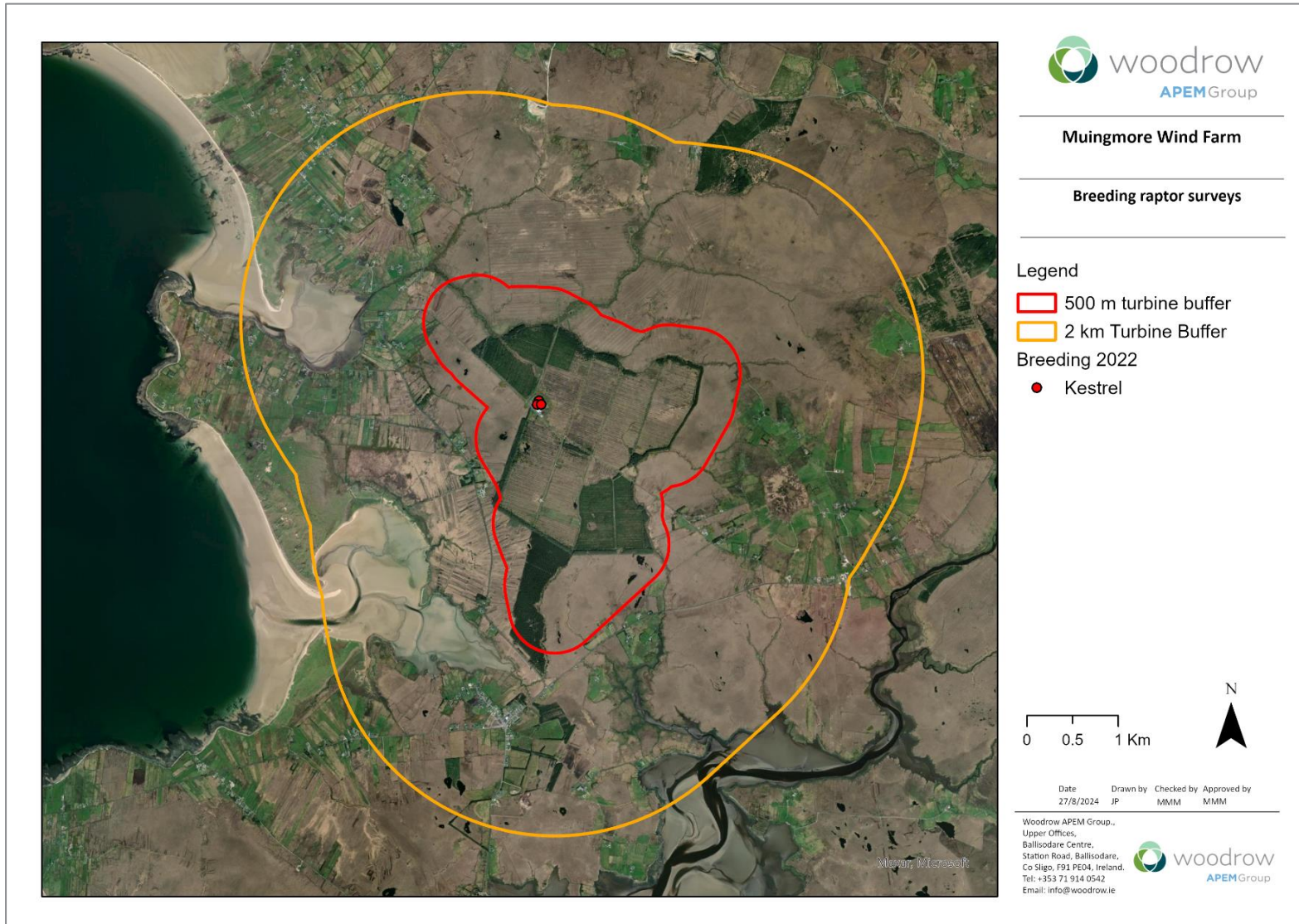


Figure 11: Raptor species recorded during the 2022 breeding raptor bird surveys within 2 km turbine buffer

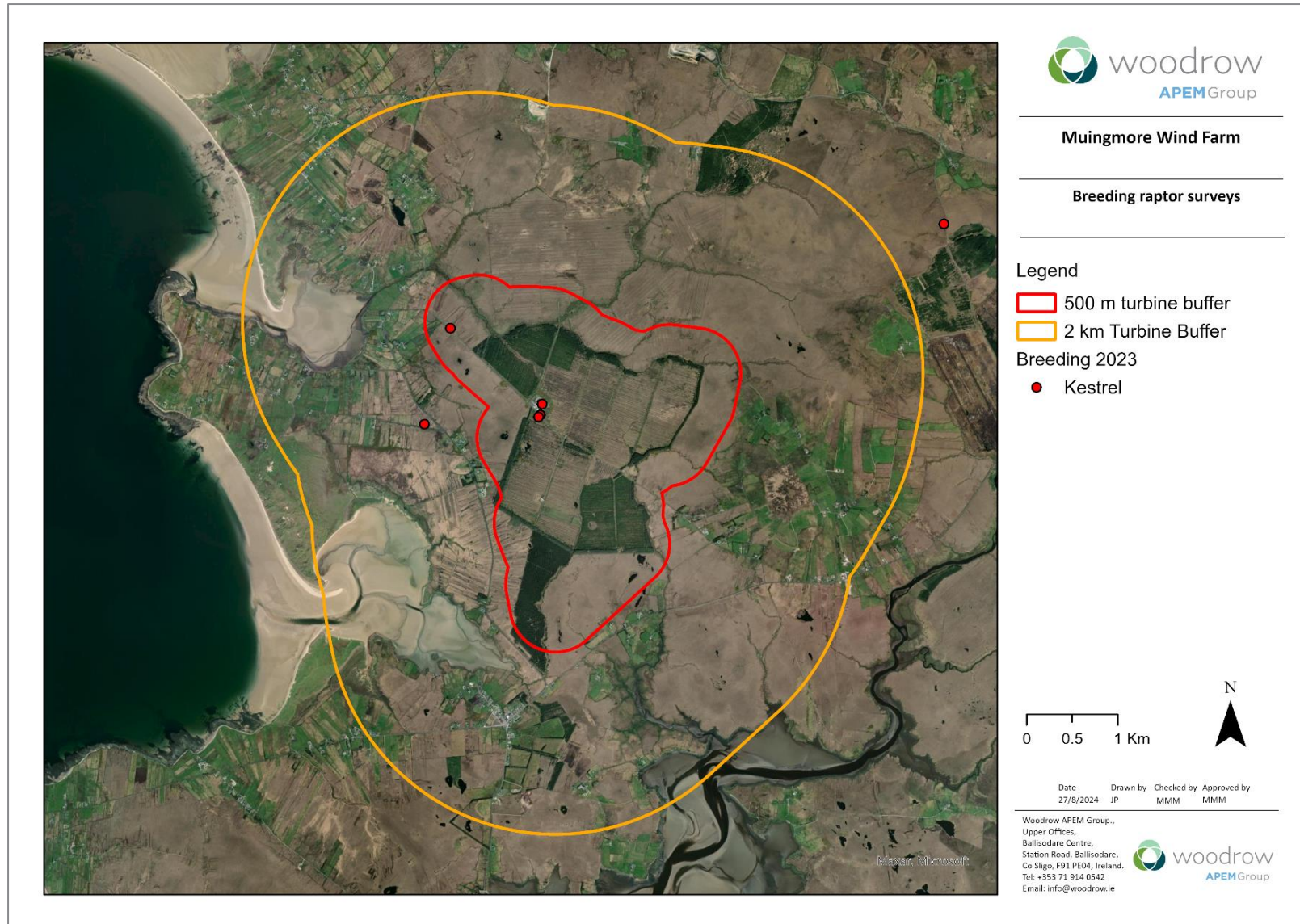


Figure 12: Raptor species recorded during the 2023 breeding raptor bird surveys within 2 km turbine buffer

4.4. Winter walkover surveys

4.4.1. Non-breeding season 2021-22

Winter walkover surveys covering the 500 m turbine buffer were undertaken on three visits during the 2021-22 non-breeding season. A total of 24 different bird species were recorded during the walkover surveys. Table 27 lists the red and amber-listed species, the number of individuals recorded on each visit and their location within the 500 m turbine buffer. Figure 13 and Figure 14 show the locations of red and amber-listed birds recorded during the 2020-21 non-breeding season, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix XI**.

Table 27: Summary of winter walkover surveys carried out during the 2021-22 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026	Location within 500 m turbine buffer
Kestrel	K.	-	1	-	Red	An observation of a male kestrel flying near the buildings in the central part of the 500 m turbine buffer
Meadow pipit	MP	13	3	8	Red	Meadow pipit was the most frequently recorded species with 6 individuals flying from any one location. Observations were mainly distributed across the grassland habitats within the 500 m buffer
Snipe	SN	5	10	4	Red	Snipe were recorded in all visits with a maximum of two individuals from any one location. Observations were mainly distributed across bog habitats within the 500 m buffer
Woodcock	WK	-	5	1	Red	Small numbers of woodcock were recorded in the south-east and western section of the 500 m buffer
Goldcrest	GC	2	3	2	Amber	Observations were mainly distributed near forestry habitat within the 500 m turbine
Linnet	LI	5	5	1	Amber	Observations were spread within the 500 m turbine
Whooper swan	WS		12	-	Amber	In January 2022 a flock of 12 birds were recorded travelling over the south of the 500 m turbine buffer

4.4.2. Non-breeding season 2022-23

Winter walkover surveys covering the 500 m turbine buffer were undertaken on three visits during the 2022-23 non-breeding season. A total of 29 different bird species were recorded during the walkover surveys. Table 28 lists the red and amber-listed species, the number of individuals recorded on each visit and their location within the 500 m turbine buffer. Figure 15 and Figure 16

show the locations of red and amber-listed birds recorded during the 2022-23 non-breeding season, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix XI**.

Table 28: Summary of winter walkover surveys carried out during the 2022-23 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026	Location within 500 m turbine buffer
Kestrel	K.	1	-	2	Red	One observation of a hunting juvenile was recorded in January over the north-east of the 500 m turbine buffer. Two observations of a hunting male were recorded during the same visit in February 2023 over the central proportion of the 500 m turbine buffer.
Meadow pipit	MP	117	93	28	Red	Meadow pipit was the most frequently recorded species with 25 individuals foraging from any one location. Observations were mainly distributed across the grassland habitats within the 500 m buffer
Redwing	RE	-	3	-	Red	One flock of three birds was observed during the visit in November 2022 over the north-east of the 500 m turbine buffer
Snipe	SN	12	20	3	Red	Observations were mainly distributed across bog habitats within the 500 m turbine buffer, and in wet grassland habitat over the central part of the 500 m buffer
Woodcock	WK	-	-	2	Red	Two observations were recorded during the same visit in February 2023 over the north-east of the 500 m turbine buffer
Black-headed gull	BH	-	2	-	Amber	Two individuals recorded on flying over the western section outside the 500 m turbine buffer.
Common gull	CM	-	1	-	Amber	One bird was recorded on flying over the western section outside the 500 m turbine buffer.
Goldcrest	GC	-	-	28	Amber	Observations were mainly distributed near forestry habitat within the 500 m turbine
Hen harrier	HH	-	-	2	Amber	Two observations of a hunting adult were recorded during the visit in January 2023 over the central and eastern portion of the 500 m turbine buffer
House sparrow	HS	3	-	-	Amber	One observation of three birds was observed during the visit in October 2022 over the south boundary of the 500 m turbine buffer

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026	Location within 500 m turbine buffer
Linnet	LI	3	2	-	Amber	Two observations were recorded over the north-west and south of the 500 m turbine buffer

4.4.3. Non-breeding season 2023-24

Winter walkover surveys covering the 500 m turbine buffer were undertaken on three visits during the 2023-24 non-breeding season. A total of 37 different bird species were recorded during the walkover surveys. Table 29 lists the red and amber-listed species, the number of individuals recorded on each visit and their location within the 500 m turbine buffer. Figure 17 and Figure 18 show the locations of red and amber-listed birds recorded during the 2023-24 non-breeding season, respectively. A list of all species recorded, including green-listed species, is provided in **Appendix XI**.

Table 29: Summary of winter walkover surveys carried out during the 2023-24 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026	Location within 500 m turbine buffer
Grey wagtail	GL	1	1	-	Red	Two observations of one grey wagtail were recorded at the same location during two different visits over the southern section of the 500 m turbine buffer
Kestrel	K.	1	1	1	Red	One observation of an adult was recorded in October over the central section of the 500 m turbine buffer. Another observation of a hunting adult male was recorded during the visit in November 2023 near the buildings in the central part of the 500 m turbine buffer. A third observation was made in January 2024 of a male flying over the bog in the north-east of the 500 m turbine buffer
Meadow pipit	MP	56	57	16	Red	Meadow pipit was the most frequently recorded species with seven individuals flying from any one location. Observations were mainly distributed across the grassland habitats within the 500 m buffer
Redwing	RE	1	-	-	Red	One redwing was observed during the visit in October 2023 over the central section of the 500 m turbine buffer
Snipe	SN	15	17	11	Red	Observations were mainly distributed across bog habitats within the 500 m turbine buffer, and in wet grassland habitat over the central part of the 500 m buffer
Woodcock	WK	-	3	4	Red	Three observations were recorded during the visit in November 2023 over the central section of the 500 m buffer. Another three observations were recorded during the visit in January 2024

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026	Location within 500 m turbine buffer
						over the south-east of the 500 m turbine buffer
Goldcrest	GC	78	-	5	Amber	Observations were mainly distributed near forestry habitat within the 500m turbine
Mallard	MA	-	-	2	Amber	An observation of two mallards was recorded in a small waterbody located in the west of the 500 m buffer
Teal	T.	-	5	-	Amber	An observation of five teal was recorded in a small waterbody located in the west of the 500 m buffer

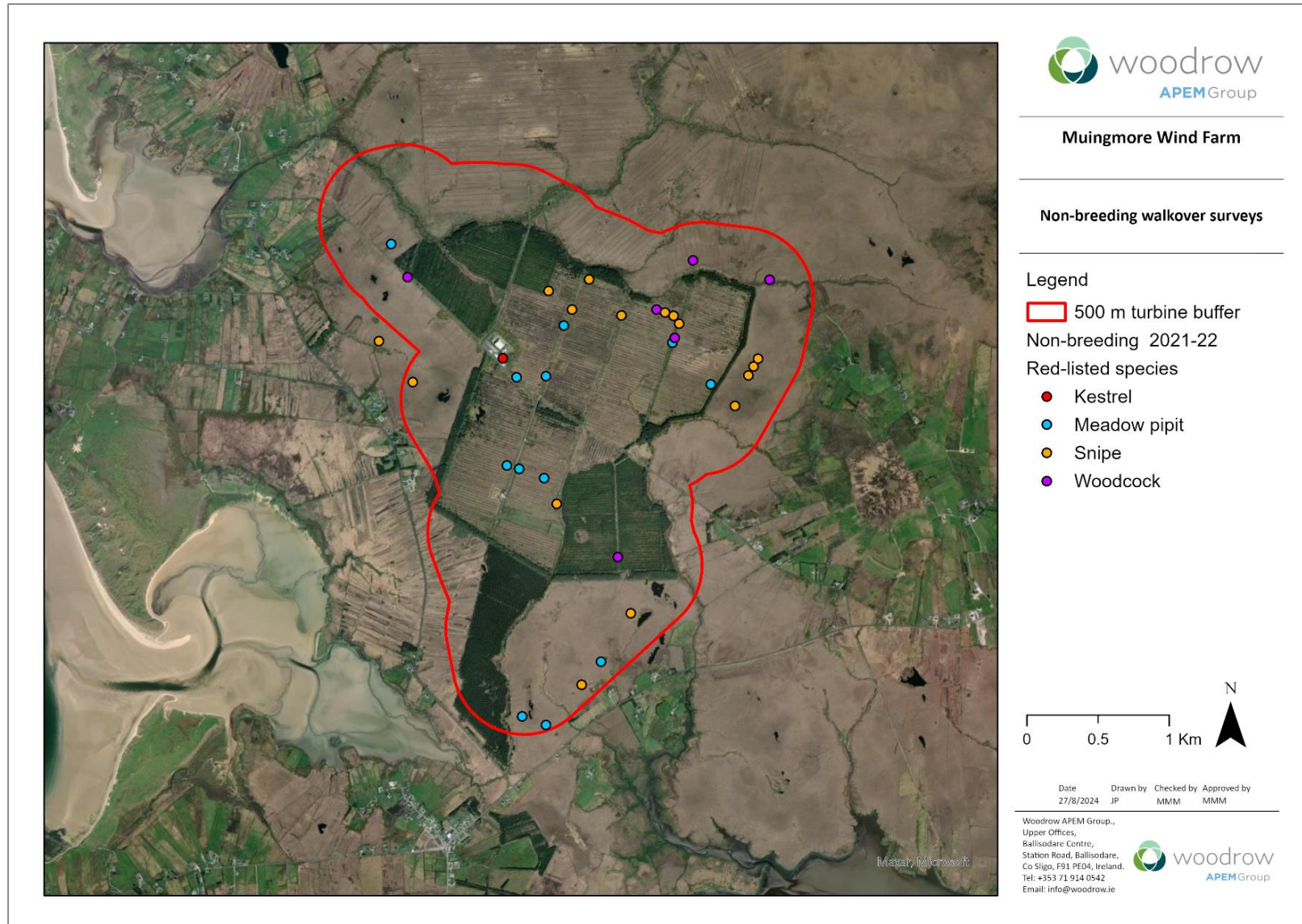


Figure 13: Red-listed species recorded during the 2021-22 non-breeding season bird surveys within 500 m turbine buffer

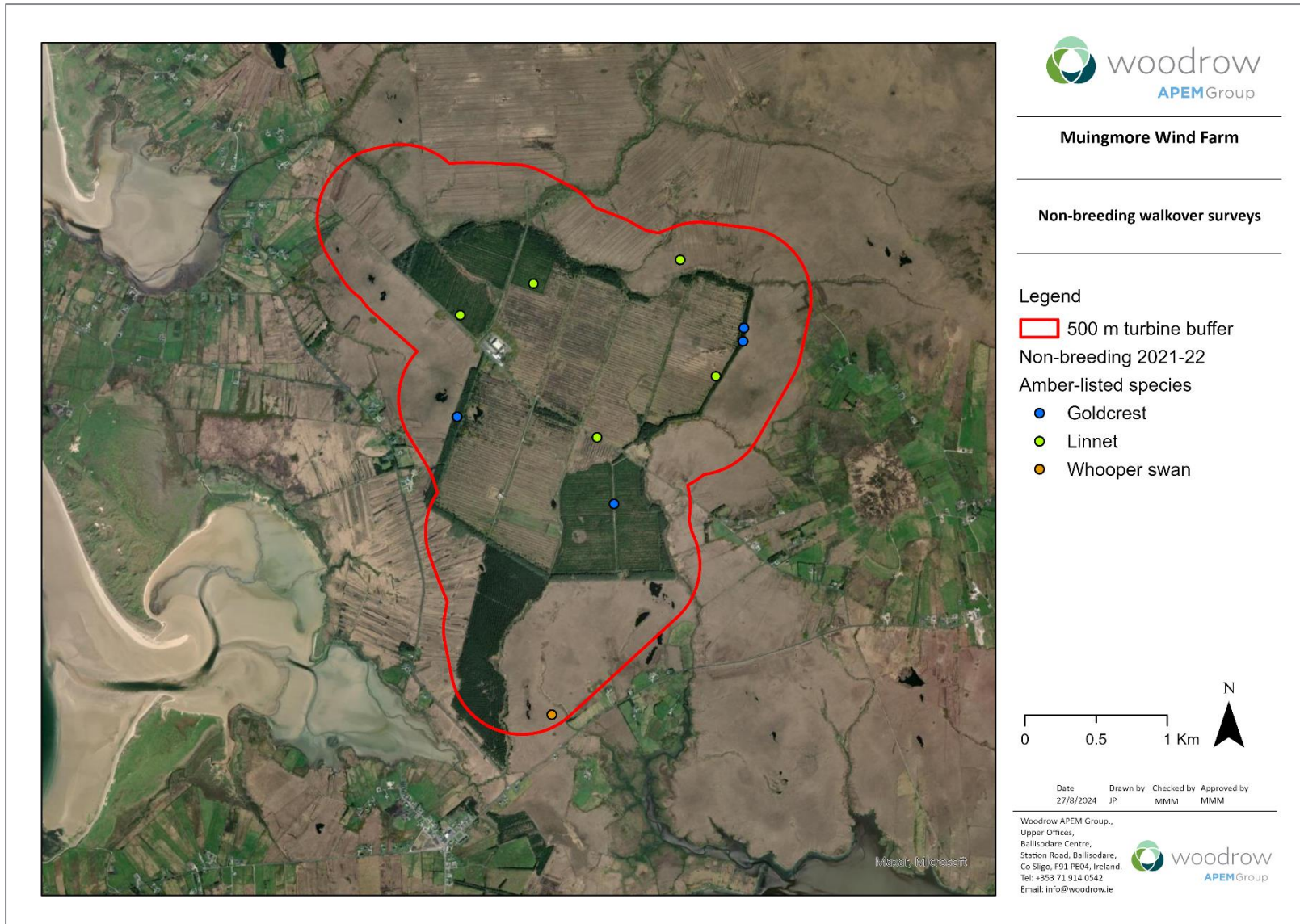


Figure 14: Amber-listed species recorded during the 2021-22 non-breeding season bird surveys within 500 m turbine buffer

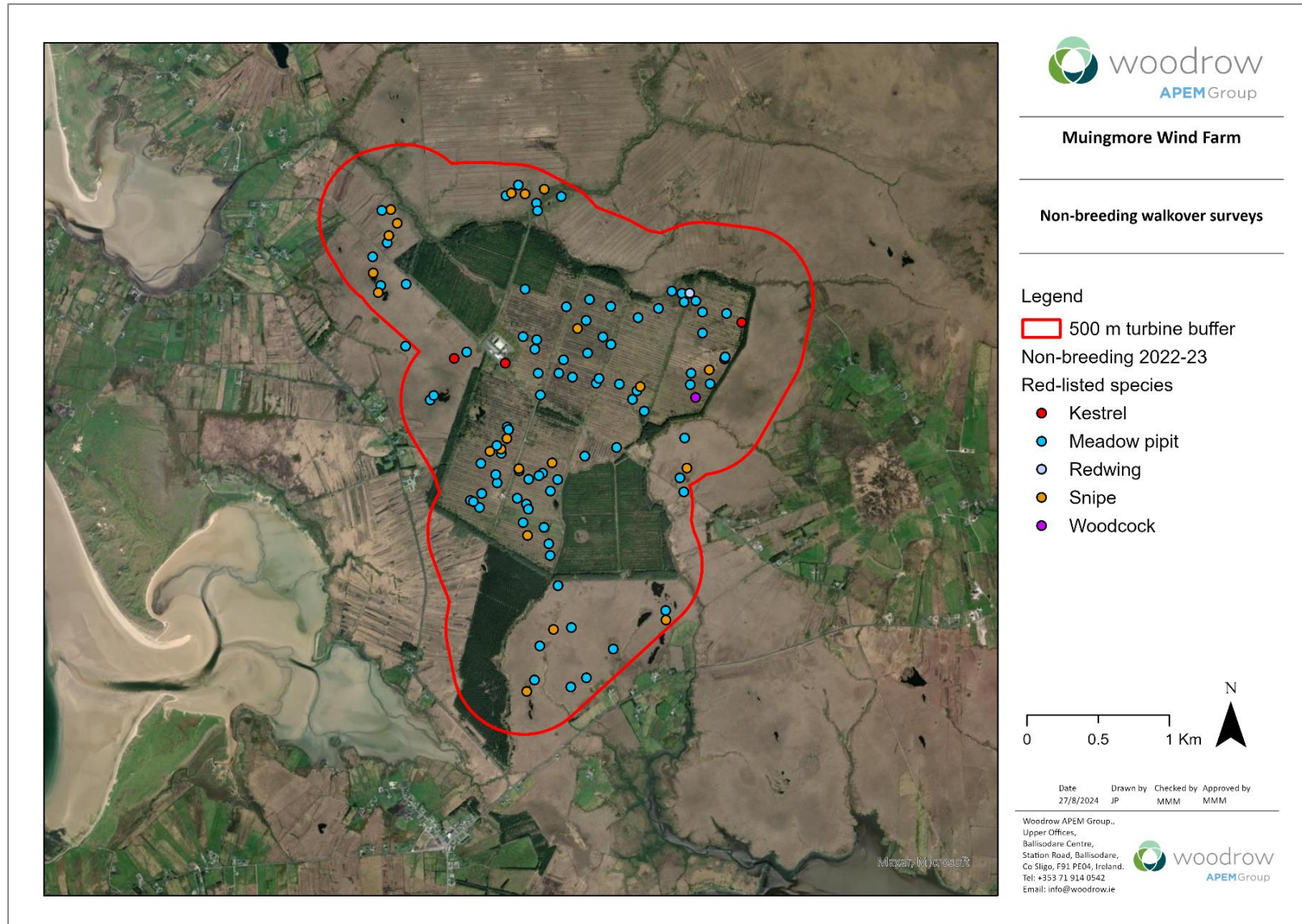


Figure 15: Red-listed species recorded during the 2022-23 non-breeding season bird surveys within 500 m turbine buffer

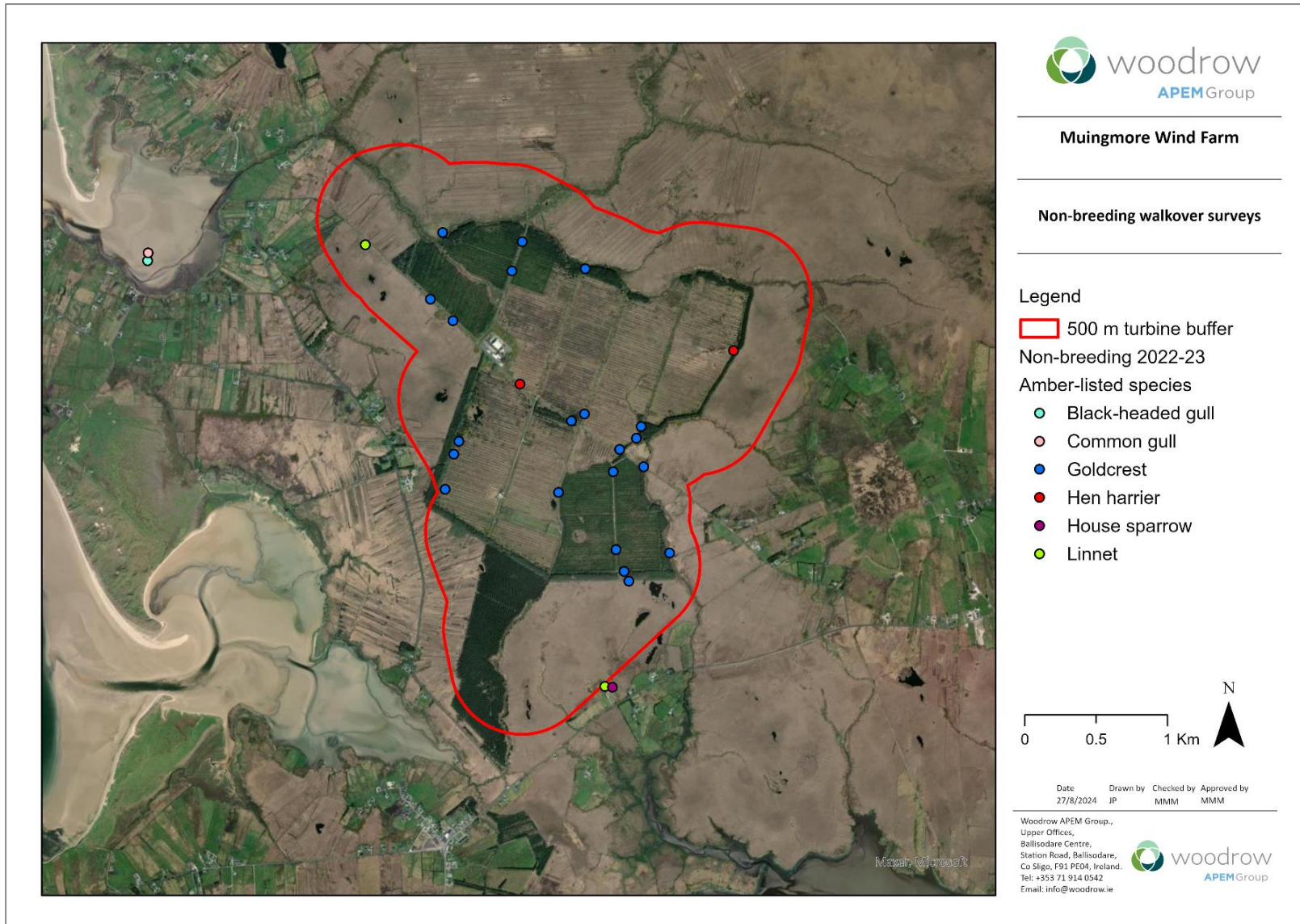


Figure 16: Amber-listed species recorded during the 2022-23 non-breeding season bird surveys within 500 m turbine buffer

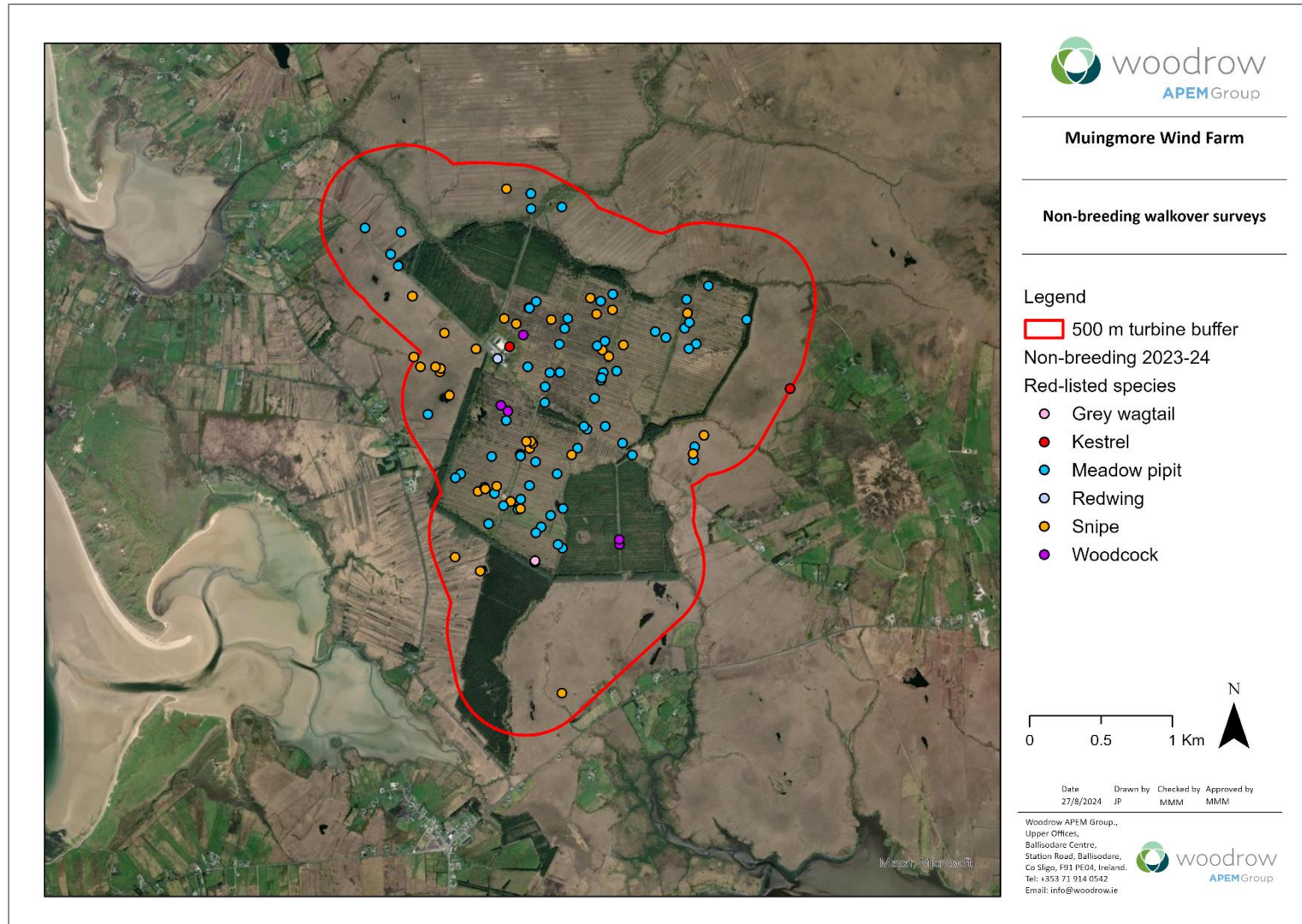


Figure 17: Red-listed species recorded during the 2023-24 non-breeding season bird surveys within 500 m turbine buffer

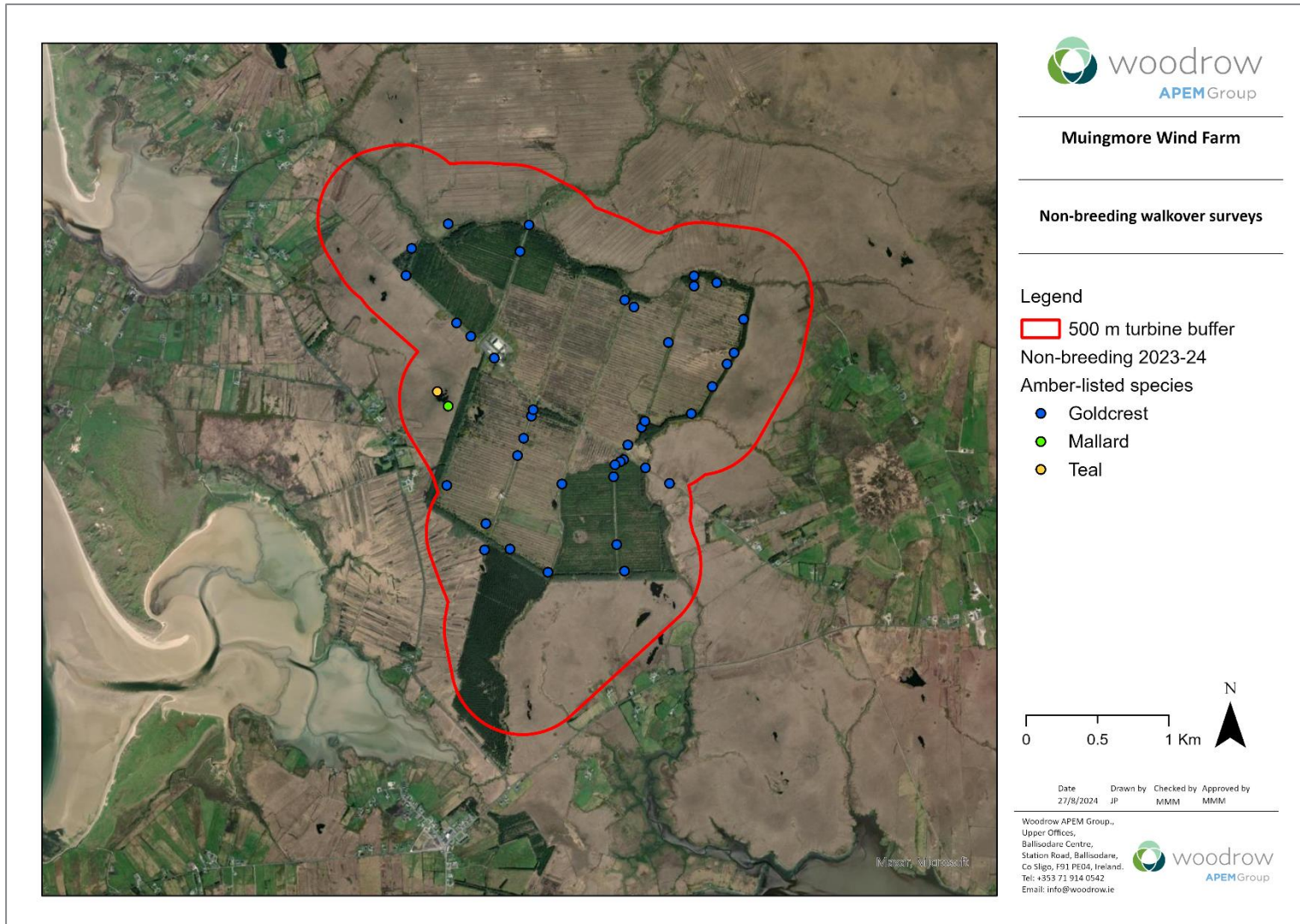


Figure 18: Amber-listed species recorded during the 2023-24 non-breeding season bird surveys within 500 m turbine buffer

4.5. Wintering waterbird surveys

4.5.1. Non-breeding season 2021-22

Table 30 lists the species and the number of waterbirds recorded on each visit to the wider area during the 2021-22 non-breeding season. From the survey results, a total of 40 waterbird species were recorded, shown in Table 30.



Muingmore

Wintering water

Legend

-  500 m turbine
-  6 km Turbine
- Non-breeding 2021
- Red-listed species
 -  Bar-tailed godwit
 -  Common scoter
 -  Curlew
 -  Dunlin
 -  Golden plover
 -  Lapwing
 -  Oystercatcher
 -  Redshank
 -  Snipe

0 0.5 1 2 Km

Date: 27/8/2024
Drawn by: JP

Woodrow APEM Group,
Upper Offices,
Balliscodare Centre,
Station Road, Balliscodare,
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Tel: +353 71 914 0542
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Figure 19 and



Figure 20 show the locations of red and amber-listed waterbirds recorded during the 2021-22 non-breeding season, respectively. Waterbird activity was higher on the west coast within the 6 km buffer, with most of the activity recorded along the Blacksod Bay/Broad Haven SPA. Gull activity was notably higher than any other species, including common gull *Larus canus*, Mediterranean gull *Ichthyaetus melanocephalus* and great black-backed. Black guillemot *Cephus grylle* was also noted in the western part of the survey area.

During these surveys, two raptor species were recorded, a single merlin in Visit 7 and a single peregrine in Visit 6.

Concentrations of waterbirds as presented in the table below, and in Figure 19 and 20, were observed in coastal, estuarine and wetland habitats associated with the Blacksod Bay/Broad Haven SPA and Carrowmore Lake SPA.

Table 30: Summary of wider area wintering waterbird surveys carried out during the 2021-22 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	Visit 7	Visit 8	BoCCI 2020-2026
Bar-tailed godwit	BA	165	200	259	133	-	116	326	83	Red
Common scoter	CX	-	-	-	-	-	-	20	-	Red
Curlew	CU	45	21	9	26	79	14	34	7	Red
Dunlin	DN	41	16	58	92	88	96	117	125	Red
Golden plover	GP	-	-	-	-	6	-	-	-	Red
Lapwing	L.	-	1		33	6	4	3	-	Red
Oystercatcher	OC	50	46	103	90	33	52	49	138	Red
Redshank	RK	8	13	20	43	21	29	6	2	Red
Snipe	SN	2	-	-	-	-	-	-	-	Red
Slavonian grebe	SZ	-	-	-	-	-	-	-	5	Red
Black guillemot	TY	-	4	-	3	79	-	8	-	Amber
Black-headed gull	BH	-	-	-	-	11	-	-	13	Amber
Brent goose	BG	-	196	133	243	34	-	155	8	Amber
Common gull	CM	-	-	-	4	18	-	72	36	Amber
Coot	CO	-	-	1	-	-	-	-	-	Amber
Cormorant	CA	2	2	3	3	2	2	9	1	Amber
Great northern diver	ND	-	1	-	2	6	-	2	-	Amber
Herring gull	HG	1	2	-	-	2	1	3	-	Amber
Lesser black-backed gull	LB	-	-	-	-	3	5	-	-	Amber
Mallard	MA	28	12	10	42	-	10	12	14	Amber
Mediterranean gull	MU	55	53	13	20	-	-	-	-	Amber
Red-breasted merganser	RM	-	13	12	20	6	-	2	2	Amber
Ringed plover	RP	60	96	48	31	-	47	124	42	Amber
Shelduck	SU	-	-	-	-	-		2	-	Amber
Teal	T.	3	12	4		-	2	-	-	Amber
Turnstone	TT	-	-	11	11	-	-	3	-	Amber
Whooper swan	WS	21	7	-	23	-	-	-	3	Amber
Wigeon	WN	2	-	8	14	36	22	4	2	Amber
Shelduck	SU	6	-	-	8	-	6	-	-	Amber
Teal	T.	16	3	2	30	-	12	-	14	Amber
Tufted duck	TU	-	-	89	95	-	68	-	27	Amber
Turnstone	TT	8	30	14	26	-	-	-	12	Amber
Whooper swan	WS	5	16	20	5	-	16	-	17	Amber
Wigeon	WN	4	15	75	20	-	32	-	35	Amber
Great black-backed gull	GB	5	-	12	9	3	3	9	11	Green
Greenshank	GK	2	-	1	5	3	1	2	7	Green
Grey heron	H	1	3	1	3	1	3	1	-	Green
Little egret	ET	-	-	-	-	-	-	2	-	Green
Little grebe	LG	-	-	-	-	-	1	-	-	Green
Sanderling	SS	-	76	83	93	6	-	55	-	Green

4.5.2. Non-breeding season 2022-23

Table 31 lists the species and the number of waterbirds recorded on each visit to the wider area during the 2022-23 non-breeding season. From the survey results, a total of 56 waterbird species were recorded (Table 31 Table 30).

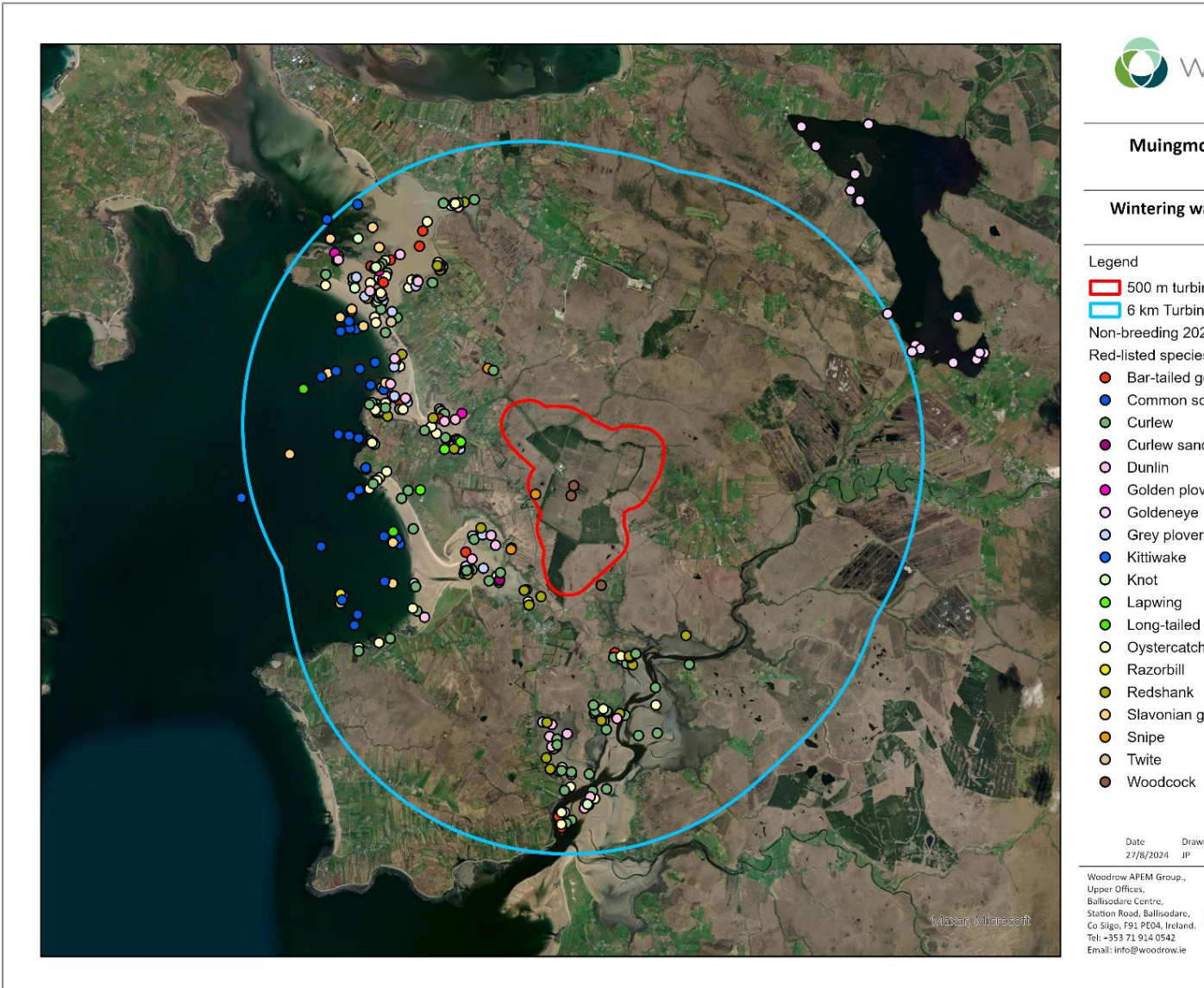


Figure 21 and

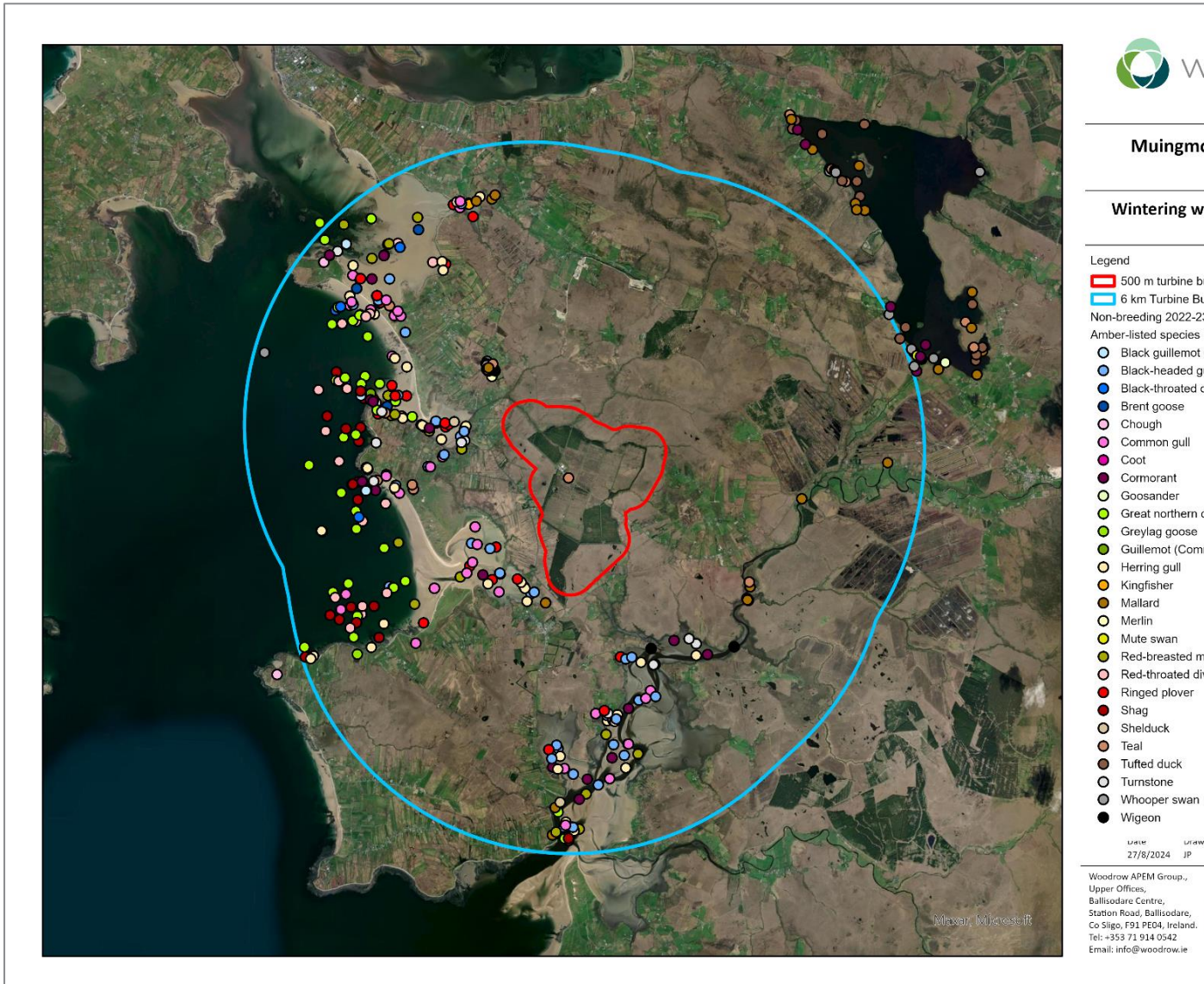


Figure 22 show the locations of red and amber-listed waterbirds recorded during the 2022-23 non-breeding season, respectively.

During these surveys, there was one observation of merlin and one observation of three chough *Pyrhocorax pyrrhocorax* during Visit 1, with one observation of 33 twite *Linaria flavirostris* in Visit 6.

Concentrations of waterbirds as presented in the table below, and in Figure 21 and 22, were observed in coastal, estuarine and wetland habitats associated with the Blacksod Bay/Broad Haven SPA and Carrowmore Lake SPA.

Table 31: Summary of wider area wintering waterbird surveys carried out during the 2022-23 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	BoCCI 2020-2026
Bar-tailed godwit	BA	114	743	755	226	710	762	Red
Common scoter	CX	109	188	111	281	103	349	Red
Curlew	CU	97	127	155	146	78	262	Red

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	BoCCI 2020-2026
Curlew sandpiper	CV	1	-	-	-	-	-	Red
Dunlin	DN	571	646	607	935	810	523	Red
Golden plover	GP	65	48	1	-	39	-	Red
Goldeneye	GN	-	-	8	10	4	14	Red
Grey plover	GV	87	53	52	68	65	155	Red
Kittiwake	KI	-	-	-	-	1	-	Red
Knot	KN	1	51	15	70	23	11	Red
Lapwing	L.	-	2	26	3	-	-	Red
Long-tailed duck	LN	-	1	-	-	-	2	Red
Oystercatcher	OC	100	38	176	151	93	136	Red
Razorbill	RA	-	-	-	-	-	1	Red
Redshank	RK	33	28	83	58	16	62	Red
Slavonian grebe	SZ	4	4	-	4	5	33	Red
Snipe	SN	5	-	1	-	-	1	Red
Woodcock	WK	-	-	-	3	-	1	Red
Black guillemot	TY	-	-	4	-	-	2	Amber
Black-headed gull	BH	91	64	15	11	-	37	Amber
Black-throated diver	BV	2	5	-	1	-	4	Amber
Brent goose	BG	-	-	28	-	77	-	Amber
Common gull	CM	18	123	16	78	8	84	Amber
Coot	CO	-	-	-	-	1	-	Amber
Cormorant	CA	9	8	3	15	22	19	Amber
Goosander	GD	-	-	-	-	-	2	Amber
Great northern diver	ND	5	54	34	53	43	129	Amber
Greylag goose	GJ	2	-	-	-	-	-	Amber
Guillemot (common)	GU	-	-	1	-	-	-	Amber
Herring gull	HG	23	17	22	10	31	126	Amber
Kingfisher	KF	-	-	1	-	-	-	Amber
Mallard	MA	13	35	26	45	17	29	Amber
Mute swan	MS	-	-	-	-	-	3	Amber
Red-breasted merganser	RM	23	33	58	25	20	66	Amber
Red-throated diver	RH	6	71	4	6	1	79	Amber
Ringed plover	RP	119	133	107	294	30	11	Amber
Shag	SA	3	38	6	27	9	47	Amber
Shelduck	SU	-	-	-	3	-	7	Amber
Teal	T.	-	20	60	67	9	28	Amber
Tufted duck	TU	-	42	-	61	56	60	Amber
Turnstone	TT	7	7	45	9	-	10	Amber
Whooper swan	WS	4	15	60	24	21	20	Amber
Wigeon	WN	13	44	10	22	48	31	Amber
Bufflehead	VH	-	2	-	-	-	-	Green
Glaucous gull	GZ	-	-	-	-	1	-	Green

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	BoCCI 2020-2026
Great black-backed gull	GB	22	9	6	13	18	33	Green
Greenshank	GK	11	13	13	15	10	9	Green
Grey heron	H	2	4	2	7	-	3	Green
Grey phalarope	PL	1	-	-	-	-	-	Green
Jack snipe	JS	-	-	1	-	-	-	Green
Light-bellied brent goose	PB	4	48	-	36	-	34	Green
Little egret	ET	-	2	4	2	2	1	Green
Little grebe	LG	-	-	-	-	2	2	Green
Moorhen	MH	17	2	3	1	-	4	Green
Ring-necked duck	NG	-	1		1	1	-	Green
Sanderling	SS	68	146	33	43	-	56	Green

4.5.3. Non-breeding season 2023-24

Table 32 lists the species and the number of waterbirds recorded on each visit to the wider area during the 2023-24 non-breeding season. From the survey results, a total of 40 waterbird species

were recorded (Table 32).



Figure 23 and Figure 24 show the locations of red and amber-listed waterbirds recorded during the 2023-24 non-breeding season, respectively.

During these surveys, there was four observations of kestrel, one observation of rock pipit *Anthus petrosus* and three observations of starling *Sturnus vulgaris*.

Concentrations of waterbirds as presented in the table below, and in Figure 23 and 24, were observed in coastal, estuarine and wetland habitats associated with the Blacksod Bay/Broad Haven SPA and Carrowmore Lake SPA.

Table 32: Summary of wider area wintering waterbird surveys carried out during the 2023-24 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	BoCCI 2020-2026
Bar-tailed godwit	BA	467	551	28	333	450	1,422	Red
Common scoter	CX	70	12	-	-	35	58	Red
Curlew	CU	53	58	32	17	16	21	Red
Dunlin	DN	68	286	240	19	549	80	Red

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	BoCCI 2020-2026
Grey plover	GV	28	38	-	-	-	65	Red
Knot	KN	72	45	-	-	-	6	Red
Lapwing	L.	-	8	2	-	-	-	Red
Long-tailed duck	LN	-	-	-	-	-	1	Red
Oystercatcher	OC	139	46	22	72	134	39	Red
Redshank	RK	51	19	10	2	6	-	Red
Slavonian grebe	SZ	-	-	-	-	-	5	Red
Black guillemot	TY	-	2	-	-	-	-	Amber
Black-headed gull	BH	33	26	1	1	-	2	Amber
Black-throated diver	BV	1	-	-	-	-	-	Amber
Brent goose	BG	4	38	25	10	43	12	Amber
Common gull	CM	50	33	32	48	24	9	Amber
Cormorant	CA	2	-	3	1	10	-	Amber
Great crested grebe	GG	-	-	-	1	-	-	Amber
Great northern diver	ND	24	2	-	-	2	15	Amber
Herring gull	HG	37	2	12	8	16	40	Amber
Lesser black-backed gull	LB	-	-	-	-	6	32	Amber
Mallard	MA	21	16	37	36	6	-	Amber
Mute swan	MS	3	-	-	18	-	3	Amber
Red-breasted merganser	RM	63	95	-	3	5	9	Amber
Red-throated diver	RH	6	2	-	-	-	9	Amber
Ringed plover	RP	304	249	5	51	29	27	Amber
Shag	SA	-	-	-	-	-	1	Amber
Shelduck	SU	6	-	-	8	6	-	Amber
Teal	T.	16	3	2	30	12	14	Amber
Tufted duck	TU	-	-	89	95	68	27	Amber
Turnstone	TT	8	30	14	26	-	12	Amber
Whooper swan	WS	5	16	20	5	16	17	Amber
Wigeon	WN	4	15	75	20	32	35	Amber
Great black-backed gull	GB	11	-	4	1	4	1	Green
Greenshank	GK	4	5	1	1	22	-	Green
Grey heron	H.	4	-	1	2	-	-	Green
Little egret	ET	-	-	1	3	1	1	Green
Little grebe	LG	-	-	-	-	2	-	Green
Moorhen	MH	2	-	-	1	-	1	Green
Sanderling	SS	162	15	34	-	-	40	Green

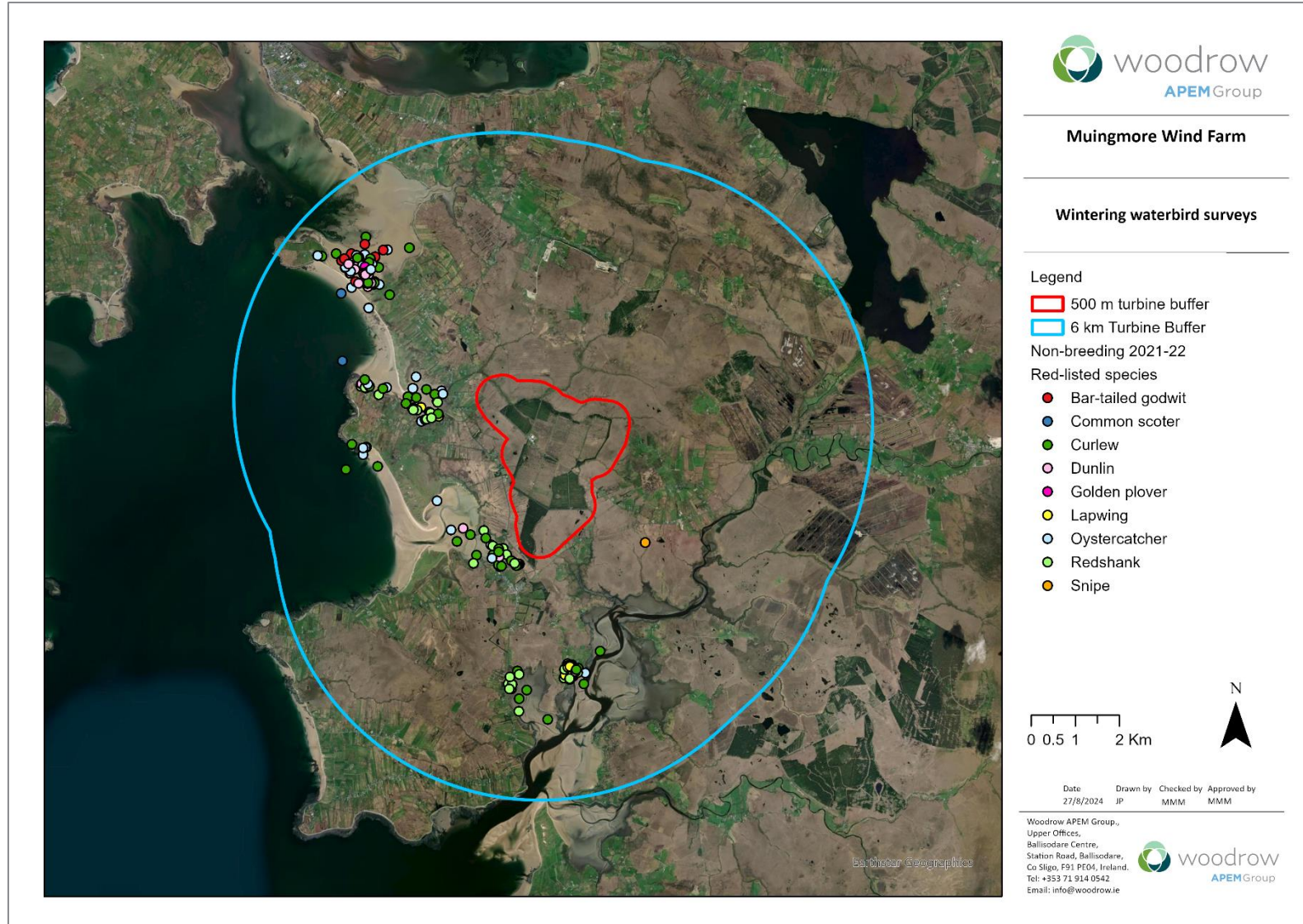


Figure 19: Red-listed species identified during waterbird surveys in the 2021-22 non-breeding season

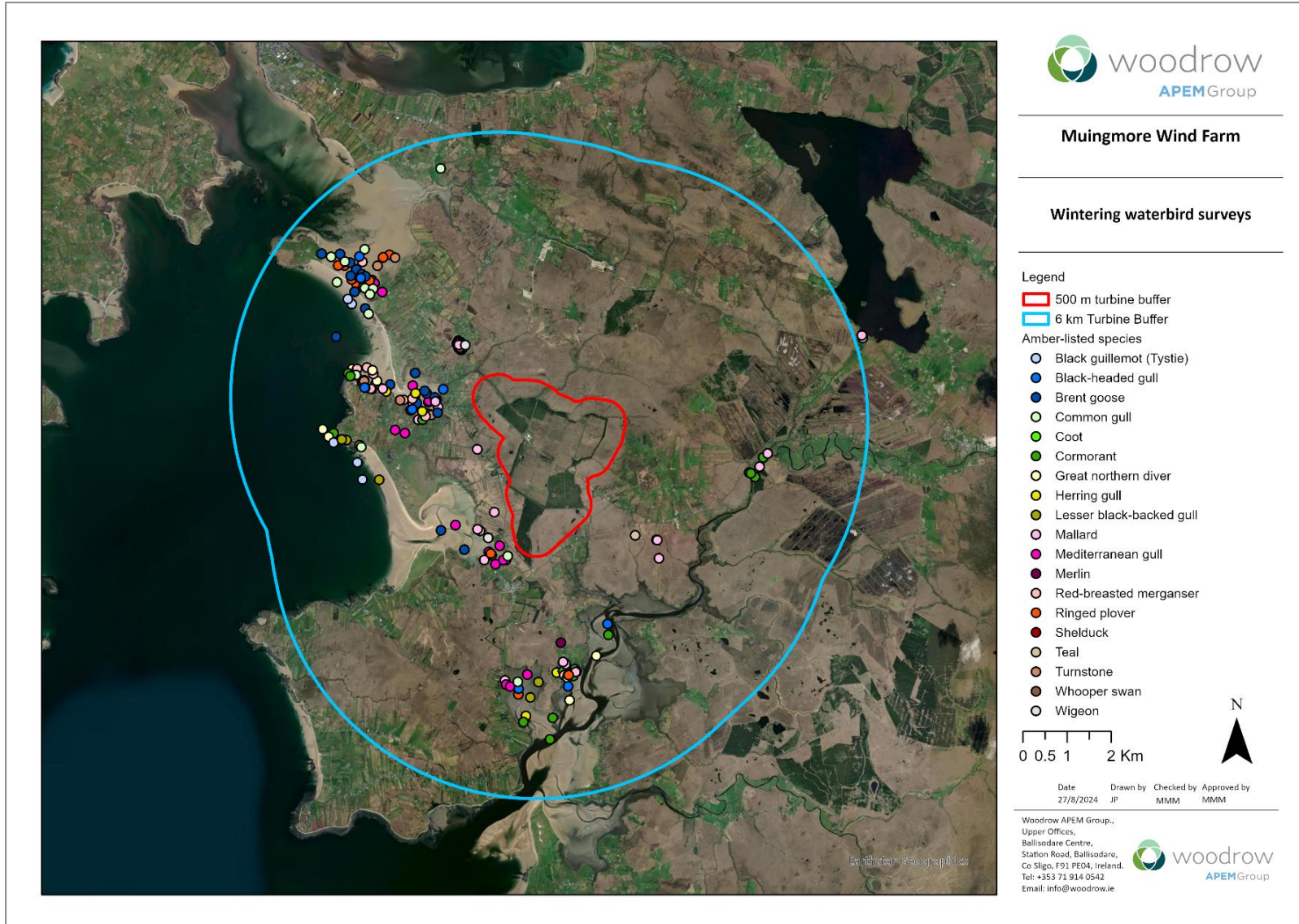


Figure 20: Amber-listed species identified during waterbird surveys in the 2021-22 non-breeding season

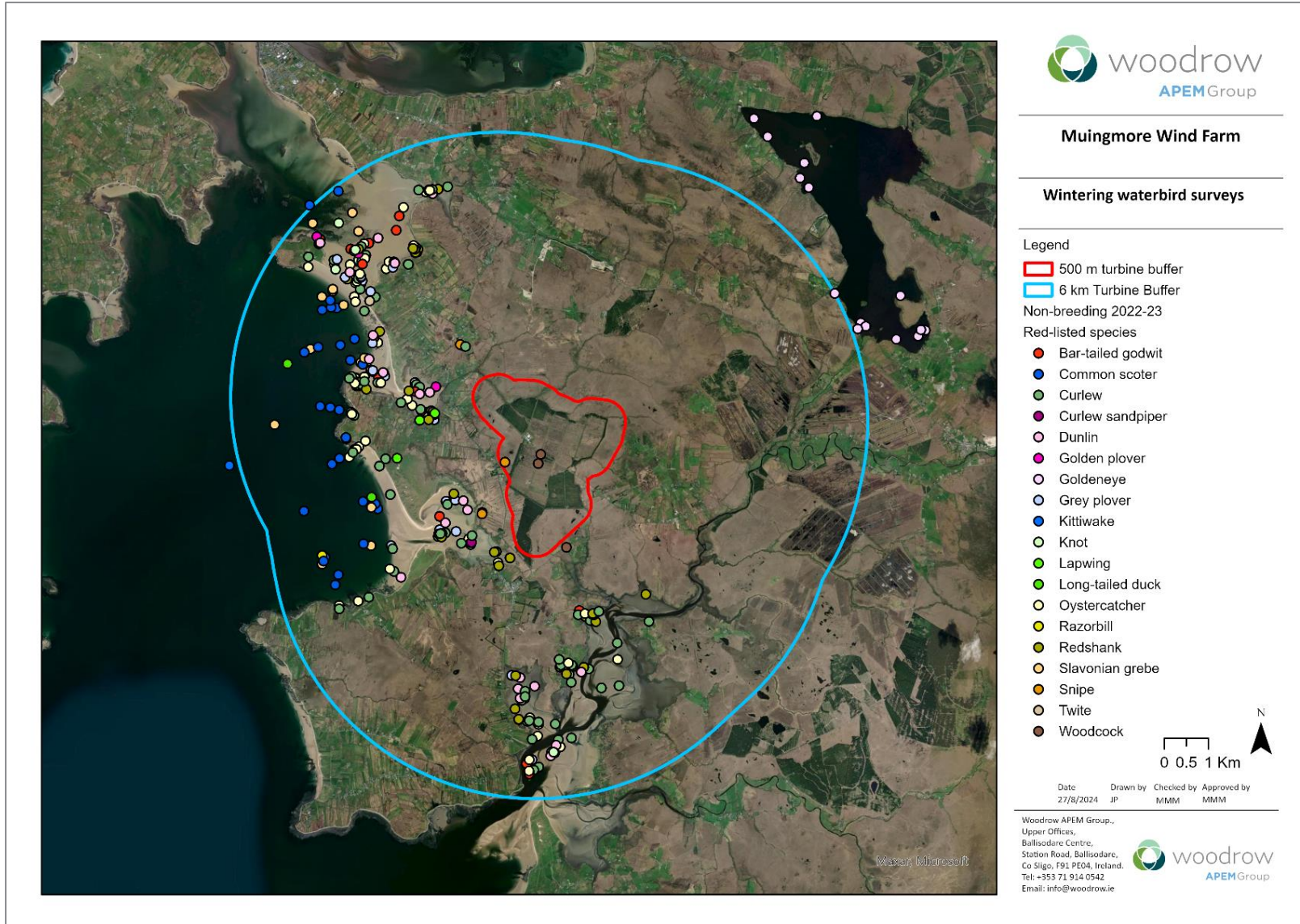


Figure 21: Red-listed species identified during waterbird surveys in the 2022-23 non-breeding season

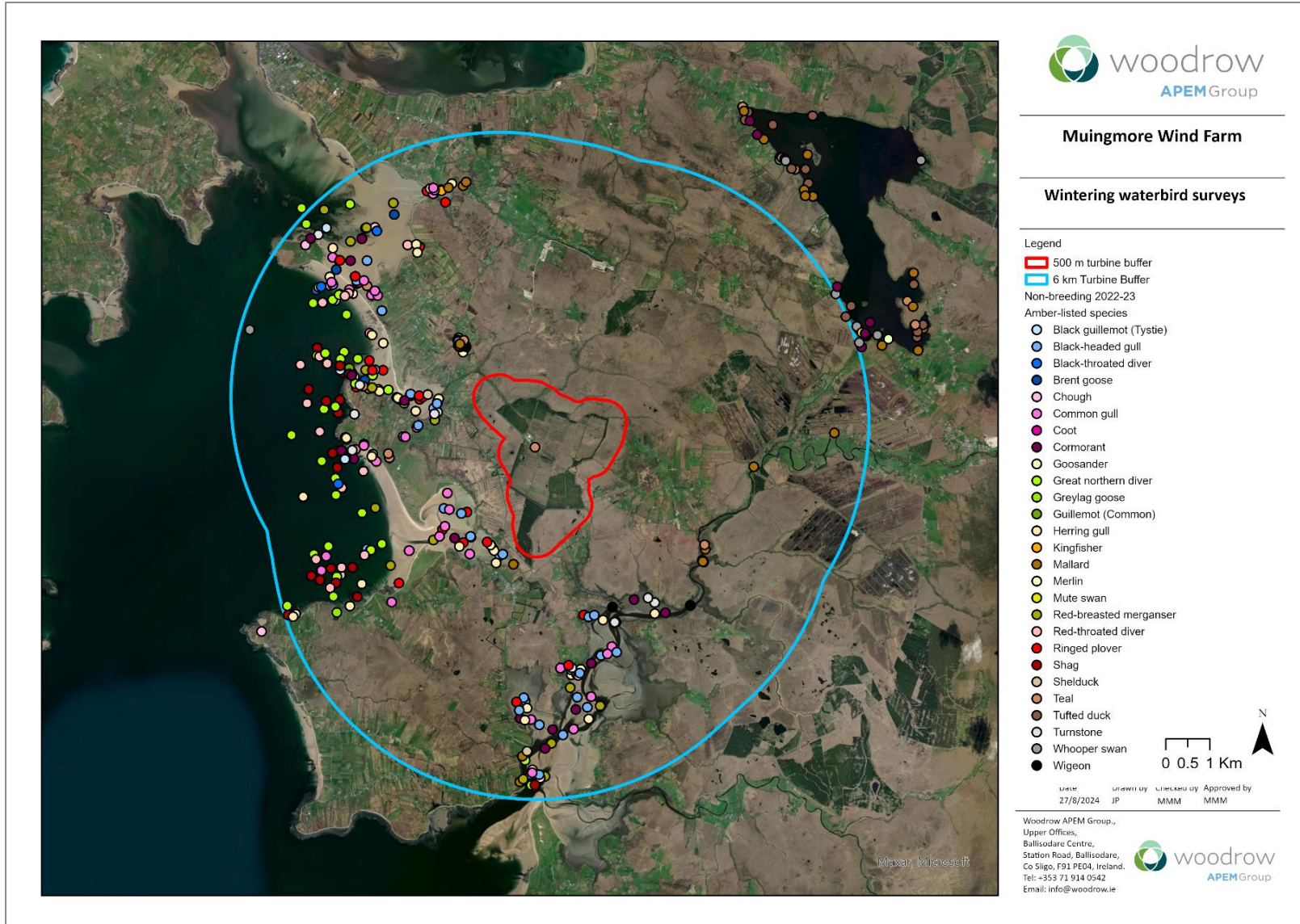


Figure 22: Amber-listed species identified during waterbird surveys in the 2022-23 non-breeding season

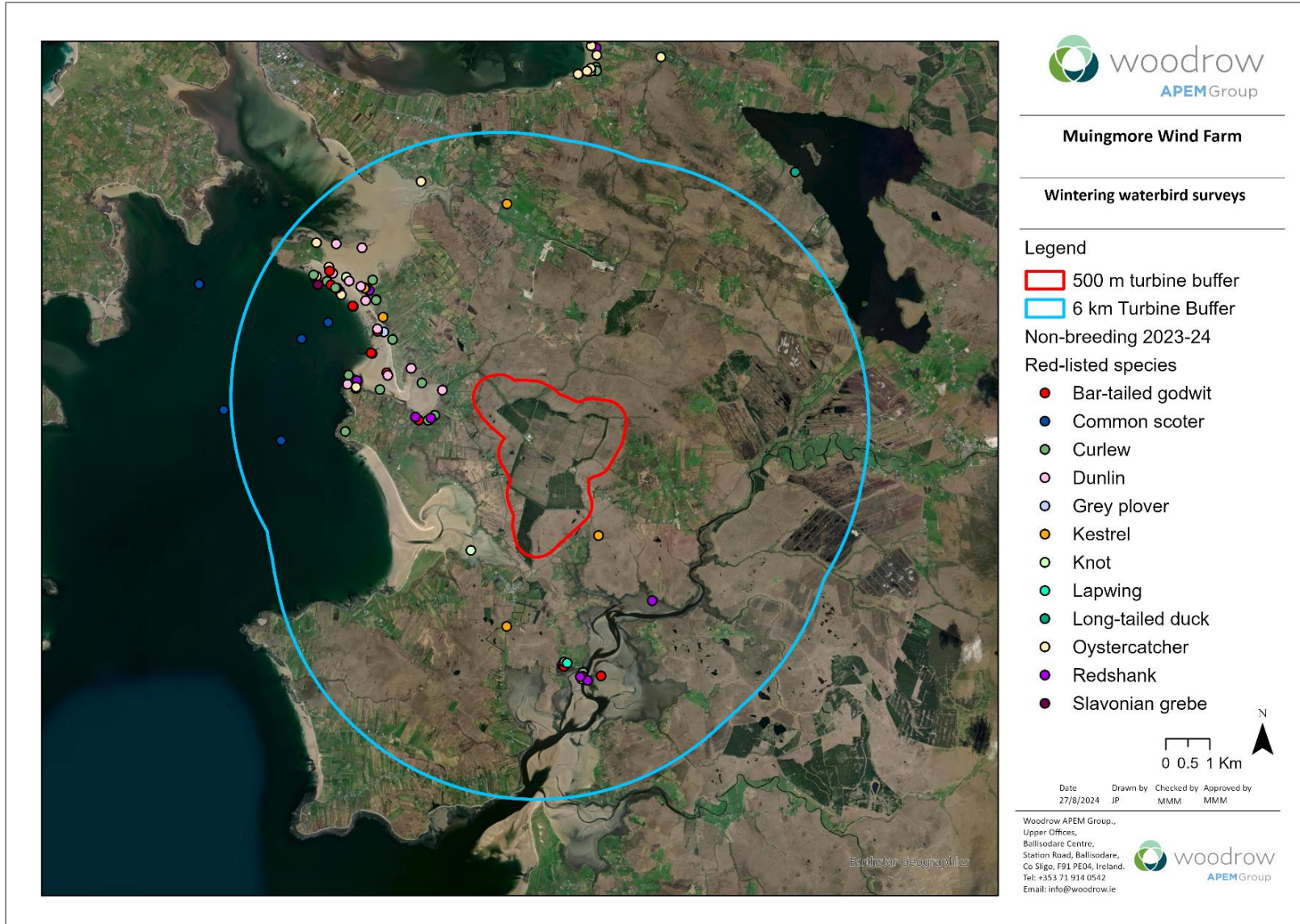


Figure 23: Red-listed species identified during waterbird surveys in the 2023-24 non-breeding season

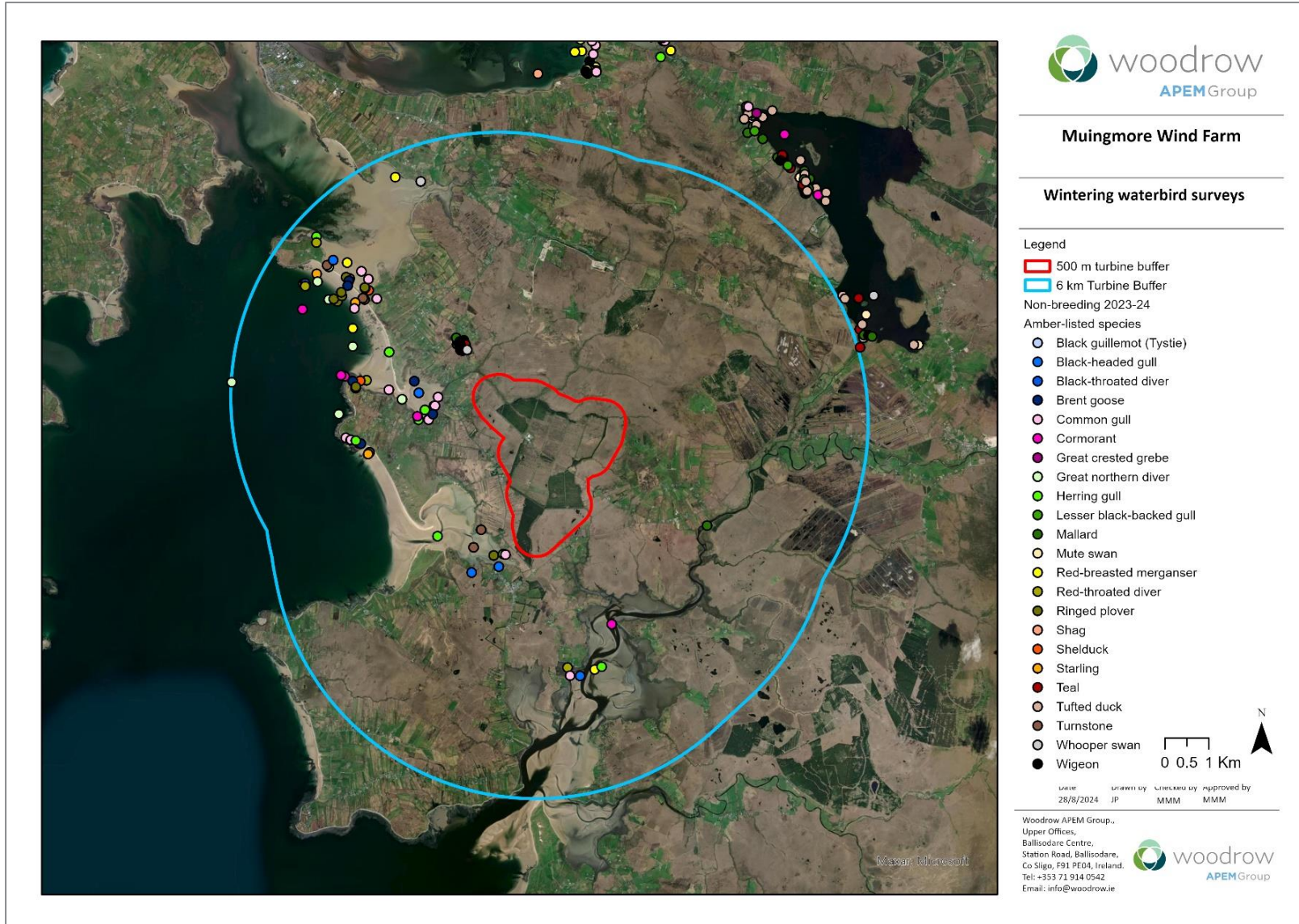


Figure 24: Amber-listed species identified during waterbird surveys in the 2023-24 non-breeding season

4.6. Bioacoustic Monitoring

No raptor species were recorded or identified during the bioacoustic monitoring. The most abundant target species was the snipe, making 78% of all the target detections, followed by the curlew (19%), while other species occasionally occurred in the recordings. Snipe produced three types of vocalisations: the snap in flight, the repetitive ground call (although sometimes in flight) and the tail drumming. Greenland white-fronted goose occurred as a flock in a single event, with multiple recordings, in the hour 10:00pm on 6 April 2023. Similarly, Barnacle goose occurred once, possibly nocturnal migration, with a single recording made at 02:30am on 28 March 2024. A range of passerine species were also identified in the recordings however were not the focus of the analysis and so are not listed here. Below is a summary of the species recorded in Table 33 and Table 34. Figure 25 presents the species recordings across all deployment periods. See **Appendix XII** a list of dates and times of each target species bioacoustic recordings.

Table 33: Overall account of target species recorded during two seasons of bioacoustic monitoring for frequency and abundance of recordings

Species	BTO code	Frequency	Abundance
Barnacle goose	BY	1	0.001
Curlew	CU	313	0.194
Grey heron	H.	1	0.001
Lapwing	L.	4	0.002
Mallard	MA	1	0.001
Moorhen	MH	7	0.004
Oystercatcher	OC	1	0.001
Snipe	SN	1255	0.779
Teal	T.	14	0.009
Greenland white-fronted goose	WG	15	0.009

Table 34: Target species for each bioacoustic monitoring deployment showing frequency and abundance of recordings

Year	Deployment dates	Monitoring unit no.	Species	BTO code	Frequency	Abundance
2	13-03-2023 to 27-03-2023	WSS045	Curlew	CU	8	0.005
	13-03-2023 to 27-03-2023	WSS045	Moorhen	MH	1	0.001
	13-03-2023 to 27-03-2023	WSS045	Snipe	SN	195	0.121
	13-03-2023 to 27-03-2023	WSS045	Teal	T.	4	0.002
	13-03-2023 to 27-03-2023	WSS049	Curlew	CU	10	0.006
	13-03-2023 to 27-03-2023	WSS049	Snipe	SN	243	0.151
	28-03-2023 to 11-04-2023	WSS045	Curlew	CU	26	0.016
	28-03-2023 to 11-04-2023	WSS045	Lapwing	L.	1	0.001
	28-03-2023 to 11-04-2023	WSS045	Mallard	MA	1	0.001
	28-03-2023 to 11-04-2023	WSS045	Moorhen	MH	5	0.003
	28-03-2023 to 11-04-2023	WSS045	Snipe	SN	102	0.063
	28-03-2023 to 11-04-2023	WSS045	Teal	T.	1	0.001
	28-03-2023 to 11-04-2023	WSS045	Greenland white-fronted goose	WG	15	0.009
	28-03-2023 to 11-04-2023	WSS049	Curlew	CU	16	0.010

Year	Deployment dates	Monitoring unit no.	Species	BTO code	Frequency	Abundance
	28-03-2023 to 11-04-2023	WSS049	Grey heron	H.	1	0.001
	28-03-2023 to 11-04-2023	WSS049	Snipe	SN	614	0.381
	28-03-2023 to 11-04-2023	WSS049	Teal	T.	4	0.002
3	13-02-2024 to 16-03-2024	WSS042	Curlew	CU	16	0.010
	13-02-2024 to 16-03-2024	WSS042	Lapwing	L.	1	0.001
	13-02-2024 to 16-03-2024	WSS042	Snipe	SN	19	0.012
	13-02-2024 to 16-03-2024	WSS042	Teal	T.	5	0.003
	13-02-2024 to 16-03-2024	WSS049	Curlew	CU	15	0.009
	13-02-2024 to 16-03-2024	WSS049	Snipe	SN	2	0.001
	17-03-2024 to 13-04-2024	WSS042	Curlew	CU	91	0.056
	17-03-2024 to 13-04-2024	WSS042	Moorhen	MH	1	0.001
	17-03-2024 to 13-04-2024	WSS042	Oystercatcher	OC	1	0.001
	17-03-2024 to 13-04-2024	WSS042	Snipe	SN	15	0.009
	17-03-2024 to 13-04-2024	WSS050	Barnacle goose	BY	1	0.001
	17-03-2024 to 13-04-2024	WSS050	Curlew	CU	81	0.050
17-03-2024 to 13-04-2024	WSS050	Snipe	SN	64	0.040	

4.7. Hen harrier roost searches

4.7.1. Non-breeding season 2021-22

No hen harrier roosts were identified during the hen harrier roost surveys undertaken in winter 2021-22. No hen harriers were noted during any of the surveys covering the proposed development site or in the wider area.

4.7.2. Non-breeding season 2022-23

No hen harrier roost or individual birds were recorded during the targeted hen harrier roost searches, and/or during other surveys undertaken over winter 2022-23 within or adjacent to the 500 m turbine buffer area.

4.7.3. Non-breeding season 2023-24

No hen harrier roosts, or individual birds, were recorded during the targeted hen harrier roost searches, and/or during other surveys undertaken over winter 2023-24 within or adjacent to the 500 m turbine buffer area.

5. DISCUSSION

5.1. Waterbirds

5.1.1. Swans, geese and ducks

Two whooper swan observations were recorded generating a total of 1,080 flight seconds over the three winter surveys, with 100% of the flight time occurring within the CRZ. Flock sizes recorded were between three and five birds. Given only two flights were observed, there is no emerging pattern that is suggestive of birds regularly travelling over the site on migration or between roost sites and foraging areas.

Of geese and ducks recorded during VP surveys, a single Canada goose *Branta canadensis* was recorded flying through the 500 m turbine buffer, generating a total of 50 flight seconds over the three-year surveys and a single greylag goose flock (17 individuals) was noted flying within the 500 m turbine buffer. Three teal *Anas crecca* flights were recorded flying through the 500 m turbine buffer equating to a total of 127 flight seconds, with 69% of the flight time occurring within the CRZ. A total of 19 mallard *Anas platyrhynchos* flights were recorded within the 500 m turbine buffer, equating to 963 flight seconds, with 90% of the flight time occurring within the CRZ. Flights were generally of one to four individuals. A potential breeding territory was identified in a small waterbody in the west part of the 500 m turbine buffer during the 2021 breeding season.

In the wider area, the high activity of waterbirds relates to the presence of the Blacksod Bay/Broad Haven SPA, which comprises of coastal and estuarine habitats in the northern part of Blacksod Bay within the 6 km turbine buffer. Carrowmore Lake SPA also holds concentrations of waterbirds recorded during the wider area waterbird surveys and is in an inland waterbody northwest of the proposed site and within the 6 km turbine buffer.

5.1.2. Waders

Eight wader species were recorded during VP watches over the three-year survey period, with the aggregated flight times for only two wader species, including snipe and Wilson's phalarope, equating to more than 1,000 seconds within the CRZ. During VP surveys one observation of curlew (two individuals), golden plover (three individuals), greenshank *Tringa nebularia* (one individual), lapwing (three individuals), whimbrel *Numenius phaeopus* (seven individuals), and Wilson's phalarope (18 individuals) were made.

A total of 22 snipe observations were recorded generating a total of 2,158 flight seconds, with 99% of the flights occurring within the CRZ. Flock size ranged from one to 27 birds with an average flock size of 2 birds. Flight activity was recorded during the non-breeding seasons with higher activity noted over the autumn passage season 2023 (1,475 flight seconds recorded), which cumulatively accounted for 70% of the flight time recorded. Additionally, 20% of the flight time recorded was noted during the non-breeding seasons and only 10% of the flight time recorded was identified during the 2023 breeding season. It is important to mention that snipe were recorded making displaying flights (drumming) around VP4 indicating breeding in this area.

Breeding bird surveys confirmed the presence of breeding snipe within the 500 m turbine buffer during both the 2019 and 2020 breeding seasons. Snipe were recorded chipping and drumming from wet grassland habitats to the north-west and south-east of the 500 m turbine buffer during the 2021 breeding season. Snipe were also considered to hold breeding territories in bog habitat in the south-east of the 500 m turbine buffer during the 2022 and 2023 breeding seasons.

A total of one Wilson's phalarope observation was recorded generating a total of 1,080 flight seconds, with 100% of the flights occurring within the CRZ. The flock comprised a total of 18 individuals.

A total of four woodcock *Scolopax rusticola* observations were recorded during the 2021-22 non-breeding season in the north and east of the 500 m turbine buffer. Woodcock were not recorded during the breeding season in any survey year.

With the exception of snipe, no other wader species were identified as breeding within the 500 m turbine buffer during the three-year survey period.

5.1.3. Gulls

Five species of gull were recorded during VP watches, including black-headed gull, common gull, great black-backed gull, herring gull, and lesser black-backed gull. Four of these species, black-headed gull, great black-backed gull, herring gull and lesser black-backed gull, generated aggregate flight time of more than 1,000 seconds within the CRZ.

Lesser black-backed gull was the most frequently recorded gull species with 82 observations generating a total of 6,142 seconds, with 95% of the seconds occurring within the CRZ. Flock size ranged from one to three birds, with typically observed flights involving one bird. Flight activity was considerably higher during the breeding seasons compared to the non-breeding seasons. The high frequency of flights recorded in summer, mainly located in the west, centre and south-west of the 500 m turbine buffer, suggests that there is likely breeding in the wider area.

The second most recorded gull species was black-headed gull with a total of 70 flights recorded equating to 6,265 flight seconds, with 55% of the seconds occurring within the CRZ. Flock size ranged from one to three birds, with typically observed flights involving one bird. More than 98% of the flights were recorded during the three breeding seasons. Black-headed gull have previously been recorded breeding on Derreens Island in Carrowmore Lake (NPWS, 2015).

A total of 63 great black-backed gull observations were recorded during VP watches over the three-year study period, totalling 6,654 flight seconds, all occurring within the CRZ. These records were widespread within the 500 m turbine buffer and within the different breeding and non-breeding seasons.

A total of 63 herring gull observations were recorded generating a total of 2,628 flight seconds, with 99% of the flights occurring within the CRZ. Flock size ranged from one to five birds. Flight activity was recorded during the breeding seasons.

One single kittiwake *Rissa tridactyla* was recorded during the 2023 spring passage season, which is a very unusual record in the area, and it is presumed to be a disoriented bird.

Surveys indicate that gulls commute across the site, with a suggestion that black-headed gull and lesser black-backed gull breed in the wider area however, the presence of breeding colonies in the wider area was not confirmed.

5.1.4. Other waterbirds

A total of five cormorant *Phalacrocorax carbo* observations were recorded generating 510 flight seconds, with 100% of the flight seconds recorded within the CRZ. All records were of single birds during the non-breeding and the autumn passage seasons, with most flights associated with birds commuting along waterbodies within the 500 m turbine buffer and in the wider area. During wider area wintering waterbird surveys, cormorant observations were associated with the Blacksod Bay/Broad Haven SPA, within the 6 km turbine buffer.

Overall, a total of 32 grey heron observations were recorded equating to 1,603 flight seconds, with 63% of the seconds occurring within the CRZ. All the records were of single birds with the majority of flights associated with birds commuting along waterbodies within the 500 m turbine buffer and in the wider area.

5.2. Raptors

Seven species of raptor were recorded during the VP surveys within the 500 m turbine buffer including buzzard, hen harrier, hobby *Falco subbuteo*, kestrel, merlin, peregrine, and sparrowhawk. Three raptor species, buzzard, kestrel and sparrowhawk, displayed a total aggregate flight time of more than 1,000 seconds within the CRZ over the three-year survey period.

Kestrel was the most active raptor species within the 500 m turbine buffer with 176 flights recorded which generated 16,849 flight seconds recorded, 90% occurring within the CRZ. Almost 70% of the flights observed were recorded during the breeding seasons. Breeding was confirmed during all three breeding seasons in the existing site. Kestrel is a red-listed species due to declining population numbers, with the national population somewhere between 9,918 and 17,393 pairs (Lewis *et al.*, 2019a).

No other raptor species were identified as breeding within the 500 m or the 2 km turbine buffer during surveys.

A total of 75 sparrowhawk observations were recorded during VP watches conducted over the three-year study period, generating 6,133 flight seconds, with 88% occurring within the CRZ. This species tends to fly relatively low (below rotor-swept height), especially when hunting. However, display flights and when commuting longer distances result in flight time within the CRZ. It is acknowledged that the application of CRMs to smaller, evasive species like sparrowhawk may not provide an accurate estimate of collision risk, as these species can be difficult to detect over the full extent of the viewsheds for VPs, due to diminutive size, cryptic nature and/or flight behaviour. While fatalities have been reported from Irish wind farm sites (Cullen and Williams, 2010), sparrowhawk is green-listed species in Ireland of least conservation concern and has a national population of 8,746 – 14,252 pairs (Lewis *et al.*, 2019a).

A total of nine buzzard sightings were recorded during VP watches over the three-year study period. Buzzard observations generated 1,051 flight seconds, with 100% occurring within the CRZ. Typically, single buzzards were recorded foraging, displaying or commuting through the 500 m turbine buffer, with occasionally up to two birds observed simultaneously. Increasingly, as post-construction monitoring programmes improve, buzzards are a species emerging as susceptible to collision with turbines. The buzzard population in Ireland has steadily increased over the last 20 years and is still expanding into new areas, seemingly only limited by the availability of nesting habitat, typically in

trees (Lusby, 2011, Balmer *et al.*, 2013). Although no population estimate is available for buzzards in Ireland, as indicated by the BoCCI green-list status of the species.

Eight hen harrier observations were recorded equating to 935 flight seconds, with 28% of the seconds occurring within the CRZ. Four of these observations were recorded during the non-breeding seasons, two observations during the breeding seasons, a single observation during the autumn passage season and another one during the spring passage season. These results, along with results of other wider area surveys including hen harrier roost watches, suggest that flights are not associated with breeding or winter roosting sites within the 2 km buffer.

A total of eight peregrine observations were recorded generating 390 flight seconds, with all the flight time occurring within the CRZ. Half of these observations were recorded during the autumn passage season and the other half during the non-breeding seasons. Typically, single birds were recorded hunting or travelling through the 500 m buffer, although on two occasions during the 2022 autumn passage season a pair was seen flying to the west and south-west of the 500 m turbine buffer. Considering the infrequency of flights over three years of surveys, the proposed development site does not represent a particularly important site for peregrine.

Five merlin flights were observed during VP surveys, including three observations during the non-breeding seasons and two during the spring passage seasons. While observations were infrequent, merlin appear to be using the lands within the proposed development site to over-winter or for commuting through the spring season.

Three hobby flights were recorded during VP watches in the 2022 breeding season. All records were observed on the same day (19 July 2022), including a single individual flying low over peatland in the west of the 500 m turbine buffer.

5.3. Other species of conservation concern

Meadow pipit, a red-listed passerine of conservation concern, was recorded during the three-year survey period. Meadow pipits were the most abundant and widespread passerine recorded during all breeding seasons, and breed within suitable open bog and grassland habitats within the 500 m turbine buffer. Eight amber-listed passerines of conservation concern were recorded during the three-year survey period and included goldcrest *Regulus regulus*, house sparrow *Passer domesticus*, linnet *Linaria cannabina*, skylark *Alauda arvensis*, willow warbler *Phylloscopus trochilus*, starling, sand martin *Riparia riparia* and swallow *Hirundo rustica*. Goldcrest were recorded breeding in suitable forestry habitat within the 500 m turbine buffer and this result was consistent during all breeding seasons. Suitable breeding habitats for swallows were identified in the existing buildings in the central part of the proposed development site. Willow warblers were recorded breeding in suitable woodlands and scrublands within the 500 m turbine buffer.

Populations of red and amber-listed passerines recorded within the proposed development site are not at risk from collisions with turbines but are sensitive to vegetation removal and disturbance.

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Appendix I - Historical records

Table I.1: NBDC bird records within 10km of the proposed site from the period 2011-22

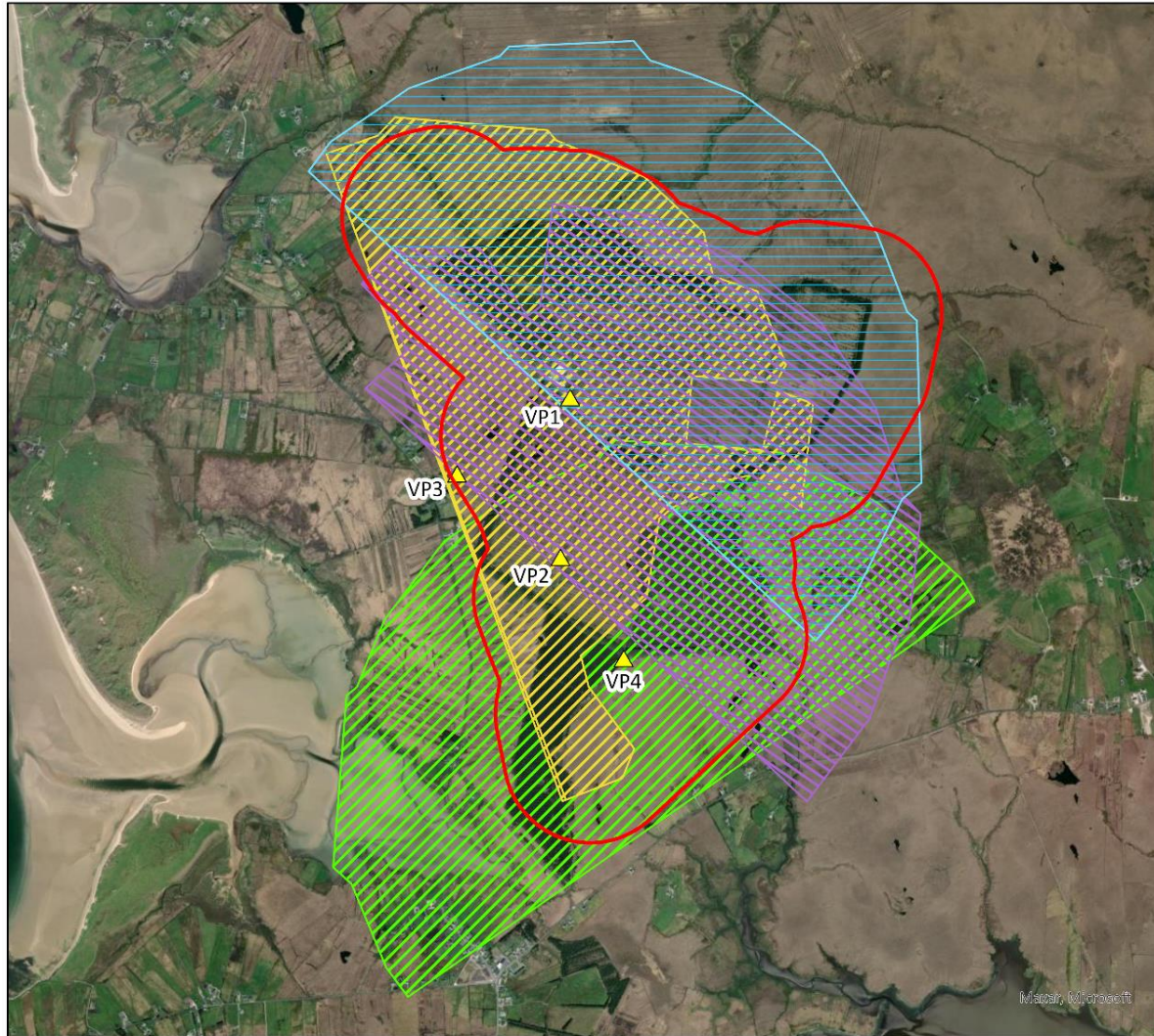
Common name	Scientific name	BoCCI 2020-2026	Count	Date
Red-listed species are species of highest conservation concern where the population is rapidly declining in abundance or range, has experienced a historic rapid decline (without recovery) or is globally threatened.				
Bar-tailed godwit	<i>Limosa lapponica</i>	Red ^{Win}	11	31/12/2011
Black-legged kittiwake	<i>Rissa tridactyla</i>	Red ^{Br}	4	15/05/2018
Common goldeneye	<i>Bucephala clangula</i>	Red ^{Win}	4	31/12/2011
Common kestrel	<i>Falco tinnunculus</i>	Red ^{Br}	21	04/08/2015
Common pochard	<i>Aythya ferina</i>	Red ^{Br. and Win}	4	31/12/2011
Common redshank	<i>Tringa totanus</i>	Red ^{Br. and Win}	22	31/12/2011
Common scoter	<i>Melanitta nigra</i>	Red ^{Br. and Win}	10	31/12/2011
Common snipe	<i>Gallinago gallinago</i>	Red ^{Br. and Win}	39	28/04/2018
Corn crake	<i>Crex crex</i>	Red ^{Br}	9	22/05/2018
Curlew sandpiper	<i>Calidris ferruginea</i>	Red ^{Passage}	1	24/02/2018
Dunlin	<i>Calidris alpina</i>	Red ^{Br. and Win}	14	31/12/2011
Eurasian curlew	<i>Numenius arquata</i>	Red ^{Br. and Win}	33	30/08/2020
Eurasian oystercatcher	<i>Haematopus ostralegus</i>	Red ^{Br. and Win}	29	10/07/2018
Eurasian woodcock	<i>Scolopax rusticola</i>	Red ^{Br}	10	31/12/2011
European golden plover	<i>Pluvialis apricaria</i>	Red ^{Br. and Win}	12	14/07/2021
European turtle dove	<i>Streptopelia turtur</i>	Red ^{Passage}	1	26/03/2018
Greater scaup	<i>Anas marila</i>	Red ^{Win}	4	31/12/2011
Grey plover	<i>Pluvialis squatarola</i>	Red ^{Win}	5	31/12/2011
Grey wagtail	<i>Motacilla cinerea</i>	Red ^{Br}	14	28/03/2019
Long-tailed duck	<i>Clangula hyemalis</i>	Red ^{Win}	5	31/12/2011
Meadow pipit	<i>Anthus pratensis</i>	Red ^{Br}	70	28/04/2018
Northern lapwing	<i>Vanellus vanellus</i>	Red ^{Br. and Win}	22	31/12/2011
Purple sandpiper	<i>Calidris maritima</i>	Red ^{Win}	3	31/12/2011
Red grouse	<i>Lagopus lagopus hibernicus</i>	Red ^{Br}	13	17/02/2020
Red knot	<i>Calidris canutus</i>	Red ^{Win}	5	31/12/2011
Redwing	<i>Turdus iliacus</i>	Red ^{Win}	13	31/12/2011
Slavonian grebe	<i>Podiceps auritus</i>	Red ^{Win}	6	31/12/2011
Twite	<i>Carduelis flavirostris</i>	Red ^{Br}	7	31/12/2011
Velvet scoter	<i>Melanitta fusca</i>	Red ^{Win}	1	31/12/2011
Amber-listed species are those with unfavourable European status, occur in internationally important numbers, are moderately declining in abundance or range, or if the population occurs in very small numbers.				
Arctic tern	<i>Sterna paradisaea</i>	Amber ^{Br}	3	31/12/2011
Barn swallow	<i>Hirundo rustica</i>	Amber ^{Br}	43	02/07/2018
Barnacle goose	<i>Branta leucopsis</i>	Amber ^{Win}	5	24/03/2018
Black guillemot	<i>Cephus grylle</i>	Amber ^{Br}	8	31/12/2011
Black-headed gull	<i>Chroicocephalus ridibundus</i>	Amber ^{Br. and Win}	31	05/08/2018
Black-throated diver	<i>Gavia arctica</i>	Amber ^{Win}	2	31/12/2011
Brent goose (light-bellied)	<i>Branta bernicla hrota</i>	Amber ^{Win}	10	31/12/2011
Common guillemot	<i>Uria aalge</i>	Amber ^{Br}	18	31/12/2011

Common name	Scientific name	BoCCI 2020-2026	Count	Date
Common kingfisher	<i>Alcedo atthis</i>	Amber ^{Br}	4	31/12/2011
Common linnet	<i>Carduelis cannabina</i>	Amber ^{Br}	31	31/12/2011
Common sandpiper	<i>Actitis hypoleucos</i>	Amber ^{Br}	14	31/12/2011
Common shelduck	<i>Tadorna tadorna</i>	Amber ^{Br. and Win}	12	07/04/2018
Common starling	<i>Sturnus vulgaris</i>	Amber ^{Br}	53	27/03/2019
Common tern	<i>Sterna hirundo</i>	Amber ^{Br}	5	10/06/2018
Eurasian teal	<i>Anas crecca</i>	Amber ^{Br. and Win}	19	31/12/2011
Eurasian tree sparrow	<i>Passer montanus</i>	Amber ^{Br}	2	15/03/2018
Eurasian wigeon	<i>Anas penelope</i>	Amber ^{Br. and Win}	11	31/12/2011
European greenfinch	<i>Carduelis chloris</i>	Amber ^{Br}	23	31/12/2011
European shag	<i>Phalacrocorax aristotelis</i>	Amber ^{Br}	10	16/05/2018
Gadwall	<i>Anas strepera</i>	Amber ^{Br. and Win}	2	31/12/2011
Goldcrest	<i>Regulus regulus</i>	Amber ^{Br}	23	29/11/2017
Goosander	<i>Mergus merganser</i>	Amber ^{Br}	2	31/12/2011
Great cormorant	<i>Phalacrocorax carbo</i>	Amber ^{Br. and Win}	31	20/02/2018
Great northern diver	<i>Gavia immer</i>	Amber ^{Win}	16	31/12/2011
Greylag goose	<i>Anser anser</i>	Amber ^{Win}	7	31/12/2011
Hen harrier	<i>Circus cyaneus</i>	Amber ^{Br}	4	31/12/2011
Herring gull	<i>Larus argentatus</i>	Amber ^{Br. and Win}	30	15/05/2018
House martin	<i>Delichon urbicum</i>	Amber ^{Br}	7	31/12/2011
House sparrow	<i>Passer domesticus</i>	Amber ^{Br}	45	27/03/2019
Lesser black-backed gull	<i>Larus fuscus</i>	Amber ^{Br. and Win}	15	12/03/2018
Mallard	<i>Anas platyrhynchos</i>	Amber ^{Br. and Win}	42	31/12/2011
Merlin	<i>Falco columbarius</i>	Amber ^{Br}	13	30/07/2017
Mew gull	<i>Larus canus</i>	Amber ^{Br. and Win}	31	31/12/2011
Mute swan	<i>Cygnus olor</i>	Amber ^{Br. and Win}	5	31/12/2011
Northern gannet	<i>Morus bassanus</i>	Amber ^{Br}	5	31/12/2011
Northern pintail	<i>Anas acuta</i>	Amber ^{Win}	3	31/12/2011
Northern wheatear	<i>Oenanthe oenanthe</i>	Amber ^{Br}	28	13/05/2021
Red-billed chough	<i>Pyrrhocorax pyrrhocorax</i>	Amber ^{Br}	4	18/03/2018
Red-breasted merganser	<i>Mergus serrator</i>	Amber ^{Br. and Win}	22	31/12/2011
Red-throated diver	<i>Gavia stellata</i>	Amber ^{Br. and Win}	6	31/12/2011
Ringed plover	<i>Charadrius hiaticula</i>	Amber ^{Br}	30	07/04/2018
Ruddy turnstone	<i>Arenaria interpres</i>	Amber ^{Win}	14	15/03/2018
Sand martin	<i>Riparia riparia</i>	Amber ^{Br}	10	31/12/2011
Sandwich tern	<i>Sterna sandvicensis</i>	Amber ^{Br}	8	31/12/2011
Sky lark	<i>Alauda arvensis</i>	Amber ^{Br}	52	02/07/2018
Spotted flycatcher	<i>Muscicapa striata</i>	Amber ^{Br}	3	21/05/2011
Tufted duck	<i>Aythya fuligula</i>	Amber ^{Br. and Win}	11	31/12/2011
Whooper swan	<i>Cygnus cygnus</i>	Amber ^{Br. and Win}	8	31/12/2011
Willow warbler	<i>Phylloscopus trochilus</i>	Amber ^{Br}	25	28/04/2018
Green-listed birds are not considered threatened.				
American golden plover	<i>Pluvialis dominica</i>	Green	7	30/09/2012

Common name	Scientific name	BoCCI 2020-2026	Count	Date
Black-billed magpie	<i>Pica pica</i>	Green	60	07/01/2018
Blackcap	<i>Sylvia atricapilla</i>	Green	2	31/12/2011
Blue tit	<i>Cyanistes caeruleus</i>	Green	38	29/03/2018
Brent goose	<i>Branta bernicla</i>	Green	13	31/12/2011
Carrion crow	<i>Corvus corone</i>	Green	5	27/03/2019
Chaffinch	<i>Fringilla coelebs</i>	Green	45	31/12/2011
Coal tit	<i>Periparus ater</i>	Green	27	26/03/2018
Common blackbird	<i>Turdus merula</i>	Green	68	27/03/2019
Common cuckoo	<i>Cuculus canorus</i>	Green	17	28/05/2018
Common grasshopper warbler	<i>Locustella naevia</i>	Green	14	28/04/2018
Common greenshank	<i>Tringa nebularia</i>	Green	12	18/03/2018
Common moorhen	<i>Gallinula chloropus</i>	Green	16	31/12/2011
Common pheasant	<i>Phasianus colchicus</i>	Green	3	31/12/2011
Common raven	<i>Corvus corax</i>	Green	17	27/05/2018
Common whitethroat	<i>Sylvia communis</i>	Green	4	31/12/2011
Common wood pigeon	<i>Columba palumbus</i>	Green	40	28/05/2018
Eurasian collared dove	<i>Streptopelia decaocto</i>	Green	11	31/12/2011
Eurasian jackdaw	<i>Corvus monedula</i>	Green	39	31/12/2011
Eurasian siskin	<i>Carduelis spinus</i>	Green	7	31/12/2011
Eurasian sparrowhawk	<i>Accipiter nisus</i>	Green	19	20/08/2018
European goldfinch	<i>Carduelis carduelis</i>	Green	18	31/12/2011
European robin	<i>Erithacus rubecula</i>	Green	64	27/03/2019
Fieldfare	<i>Turdus pilaris</i>	Green	10	27/03/2018
Great black-backed gull	<i>Larus marinus</i>	Green	16	31/12/2011
Great tit	<i>Parus major</i>	Green	16	31/12/2011
Greater white-fronted goose	<i>Anser albifrons</i>	Green	6	31/12/2011
Greenland white-fronted goose	<i>Anser albifrons flavirostris</i>	Green	4	31/12/2011
Green-winged teal	<i>Anas carolinensis</i>	Green	2	31/12/2011
Grey heron	<i>Ardea cinerea</i>	Green	23	22/05/2018
Hedge accentor	<i>Prunella modularis</i>	Green	41	31/12/2011
Hooded crow	<i>Corvus cornix</i>	Green	76	28/04/2018
Iceland gull	<i>Larus glaucooides</i>	Green	4	18/03/2018
Jack snipe	<i>Lymnocyptes minimus</i>	Green	2	31/12/2011
Lesser redpoll	<i>Carduelis flammea cabaret</i>	Green	23	28/04/2018
Little grebe	<i>Tachybaptus ruficollis</i>	Green	8	31/12/2011
Long-eared owl	<i>Asio otus</i>	Green	3	31/12/2011
Long-tailed tit	<i>Aegithalos caudatus</i>	Green	2	31/12/2011
Mistle thrush	<i>Turdus viscivorus</i>	Green	15	27/03/2019
Peregrine falcon	<i>Falco peregrinus</i>	Green	5	24/05/2018
Pied wagtail	<i>Motacilla alba yarrellii</i>	Green	2	05/01/2018
Pink-footed goose	<i>Anser brachyrhynchus</i>	Green	3	31/12/2011
Red-necked grebe	<i>Podiceps grisegena</i>	Green	3	31/12/2011
Reed bunting	<i>Emberiza schoeniclus</i>	Green	40	31/12/2011

Common name	Scientific name	BoCCI 2020-2026	Count	Date
Ring-necked duck	<i>Aythya collaris</i>	Green	3	31/12/2011
Rock pigeon	<i>Columba livia</i>	Green	3	31/12/2011
Rock pipit	<i>Anthus petrosus</i>	Green	17	31/12/2011
Rook	<i>Corvus frugilegus</i>	Green	16	31/12/2011
Sanderling	<i>Calidris alba</i>	Green	9	07/04/2018
Sedge warbler	<i>Acrocephalus schoenobaenus</i>	Green	24	31/12/2011
Snow bunting	<i>Plectrophenax nivalis</i>	Green	1	31/12/2011
Snow goose	<i>Anser caerulescens</i>	Green	4	31/12/2011
Song thrush	<i>Turdus philomelos</i>	Green	48	15/03/2018
Stonechat	<i>Saxicola torquata</i>	Green	50	31/12/2011
Water rail	<i>Rallus aquaticus</i>	Green	2	31/12/2011
White wagtail	<i>Motacilla alba</i>	Green	51	31/12/2011
White-rumped sandpiper	<i>Calidris fuscicollis</i>	Green	3	02/10/2012
White-throated dipper	<i>Cinclus cinclus</i>	Green	6	19/04/2016
Winter wren	<i>Troglodytes troglodytes</i>	Green	68	28/04/2018

Appendix II - VP viewshed analysis

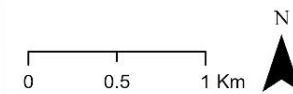


Muingmore Wind Farm

Viewshed analysis

Legend

- 500 m turbine buffer
- VP locations
- Viewshed VP1
- Viewshed VP2
- Viewshed VP3
- Viewshed VP4



Date: 28/8/2024
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Appendix III - VP watches effort tables

Table III.1: VP watch survey hours completed at the 500 m turbine buffer during the 2021 breeding season

Breeding season 2021				
Date	VP1	VP2	VP3	VP4
27/04/2021	3	3	-	-
28/04/2021	3	-	3	-
10/05/2021	-	3	3	-
08/06/2021	3	-	-	3
09/06/2021	-	3	3	
10/06/2021	3		-	3
17/06/2021	2	2	-	
21/06/2021	2		2	2
28/06/2021	2	2	2	
01/07/2021	-	6	-	-
12/07/2021	3	-	-	3
13/07/2021	2		2	2
14/07/2021	-	2	2	2
15/07/2021	3	-	3	-
19/07/2021	-	-	3	3
21/07/2021	-	3	2	-
22/07/2021	-		2	3
04/08/2021	-	3	3	
10/08/2021	-		3	3
2/08/2021	3	3	-	-
18/08/2021	-	-	-	6
23/08/2021	6	-	-	-
24/08/2021	-	3	-	3
25/08/2021	3	-	3	-
26/08/2021	-	3	-	3
Total hours	38	36	36	36

Table III.2: VP watch survey hours completed at the 500 m turbine buffer during the 2021 autumn passage season

Autumn passage season 2021				
Date	VP1	VP2	VP3	VP4
07/09/2021	-	1.5	-	1.5
09/09/2021	1.5	-	1.5	-
27/09/2021	1.5	-	1.5	-
28/09/2021	-	1.5	-	1.5
04/10/2021	1.5	-	1.5	-
05/10/2021	-	1.5		1.5
Total hours	4.5	4.5	4.5	4.5

Table III.3: VP watch survey hours completed at the 500 m turbine buffer during the 2021-22 non-breeding season

Non-breeding season 2021-22				
Date	VP1	VP2	VP3	VP4
13/10/2021	3	3	-	-
14/10/2021	-	-	3	3
20/10/2021	3	3	-	-
25/10/2021	-	-	3	3
19/11/2021	3	3	-	-
22/11/2021	-	3	3	-
24/11/2021	3	-	-	3
25/11/2021	-	-	3	3
29/11/2021	-	-	3	3
09/12/2021	3	-	-	-
16/12/2021	3	-	3	-
17/12/2021	-	3	3	-
10/01/2022	-	3	-	3
12/01/2022	-	-	-	3
18/01/2022	3	3	-	-
19/01/2022	3	3	-	-
27/01/2022	3	3	-	-
31/01/2022	-	-	6	-
01/02/2022	-	-	-	3
09/02/2022	3	-	-	-
17/02/2022	3	-	3	-
18/02/2022	-	-	-	3
21/02/2022	-	3	3	
23/02/2022	-		-	3
28/02/2022	-	3	-	-
01/03/2022	-		-	3
04/03/2022	-	2	-	-
09/03/2022	-	-	3	3
10/03/2022	3	3	-	-
Total hours	36	38	36	36

Table III.4: VP watch survey hours completed at the 500 m turbine buffer during the 2022 breeding season

Breeding season 2022				
Date	VP1	VP2	VP3	VP4
14/04/2022	3	3	-	-
15/04/2022	-	-	3	3
21/04/2022	-	3		3
27/04/2022	3	-	3	-
28/04/2022	-	3	-	3
04/05/2022	3	-	3	-
05/05/2022	-	3	-	3
17/05/2022	-	3	6	-
02/06/2022	-	-	3	-

Breeding season 2022				
Date	VP1	VP2	VP3	VP4
18/05/2022	6	-	-	-
25/06/2022	6	-	-	-
06/07/2022	3	-	-	-
19/07/2022	3	-	3	-
03/08/2022	3	3	-	-
09/08/2022	6	-	-	-
16/05/2022	-	6	-	-
24/06/2022	-	6	-	-
18/08/2022	-	6	-	-
13/06/2022	-	-	6	-
08/08/2022	-	-	6	-
15/05/2022	-	-	-	6
26/06/2022	-	-	-	6
27/07/2022	-	-	-	6
11/08/2022	-	-	6	-
29/08/2022	-	-	-	6
Total hours	36	36	39	36

Table III.5: VP watch survey hours completed at the 500 m turbine buffer during the 2022 autumn passage season

Autumn passage season 2022				
Date	VP1	VP2	VP3	VP4
12/09/2022	5	3	-	-
13/09/2022		6	-	2
11/10/2022	1	3	-	3
12/10/2022	-	3	1	-
14/10/2022		3		-
19/10/2022	-	-	3	-
14/09/2022	-	-	8	3
15/09/2022	-	-	1	1
10/10/2022	2	-	2	-
13/10/2022	3	-	3	3
11/09/2022	4	-	-	3
16/10/2022	-	-	-	3
17/10/2022	3	-	-	-
Total hours	18	18	18	18

Table III.6: VP watch survey hours completed at the 500 m turbine buffer during the 2022-23 non-breeding season

Non-breeding season 2022-23				
Date	VP1	VP2	VP3	VP4
19/10/2022	3	3	-	-
08/11/2022	3	3	-	-
10/11/2022	2		3	2
11/11/2022	2.5	3	-	-

Non-breeding season 2022-23				
Date	VP1	VP2	VP3	VP4
13/11/2022	1	-	1.5	
14/11/2022	1.5	-	-	3
17/11/2022	2	-	3	2
07/12/2022	5	-	-	-
08/12/2022	1	-	6	-
21/01/2023	3	-	1	6
25/01/2023	3	3	-	-
08/02/2023	3	3	-	-
21/02/2023	6	-	-	-
09/11/2022	-	3	-	-
15/11/2022	-	3	1.5	-
12/12/2022	-	6	-	-
30/01/2023	-	3	-	-
22/02/2023	-	6		-
20/10/2022	-	-	1	3
21/10/2022	-	-	2	-
07/11/2022	-	-	3	3
20/01/2023	-	-	2	-
29/01/2023	-	-	3	-
18/02/2023	-	-	5	-
19/02/2023	-	-	4	5
12/11/2022	-	-	-	1.5
11/12/2022	-	-		4.5
15/12/2022	-	-		2
20/02/2023	-	-		4
Total hours	36	36	36	36

Table III.7: VP watch survey hours completed at the 500 m turbine buffer during the 2023 spring passage season

Spring passage season 2023				
Date	VP1	VP2	VP3	VP4
01/03/2023	-	-	3	-
02/03/2023	3	4.5	-	-
03/03/2023	-	-	2.5	3
05/03/2023	1.5	-	3.5	-
06/03/2023	1.5	-	-	-
08/03/2023	-	-	-	3
04/04/2023	-	-	9	-
05/04/2023	-	-	-	8
06/04/2023	6	-	-	-
07/04/2023	6	-	-	
09/04/2023	-	-	-	4
10/04/2023	-	7	-	-
11/04/2023	-	7	-	-

Total hours	18	18.5	18	18
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Table III.8: VP watch survey hours completed at the 500 m turbine buffer during the 2023 breeding season

Breeding season 2023				
Date	VP1	VP2	VP3	VP4
01/03/2023	3	-	-	3
04/03/2023	-	-	-	1.5
05/03/2023	-	2	-	-
06/03/2023	-	3	-	1.5
08/03/2023	-	3	-	-
09/03/2023	3	-	3	-
05/04/2023	-	-	3	-
04/05/2023	-	-	9	-
05/05/2023	-	-	-	9
06/05/2023	9	-	-	-
07/05/2023	-	6	-	-
08/05/2023	-	4	-	-
07/06/2023	-	-	9	-
08/06/2023	-	-	-	9
09/06/2023	9	-	-	-
10/06/2023	-	9	-	-
05/07/2023	3	3	-	-
06/07/2023	3	-	-	-
25/07/2023	-	2	3	3
26/07/2023	-	1	3	3
01/08/2023	3	-	6	-
02/08/2023	3	3	-	-
03/08/2023	-	3	-	3
09/08/2023	-	-	-	3
Total hours	36	39	36	36

Table III.9: VP watch survey hours completed at the 500 m turbine buffer during the 2023 autumn passage season

Autumn passage season 2023				
Date	VP1	VP2	VP3	VP4
02/09/2023	-	-	8	-
05/09/2023	-	-	-	6
06/09/2023	-	-	4	-
07/09/2023	9	-	-	-
12/09/2023	-	1	-	-
11/10/2023	-	-	6	-
13/10/2023	-	-	-	13.5
14/10/2023	9	-	-	1.25
17/10/2023	-	2.5	-	-
31/10/2023	-	9.5	-	-
03/11/2023	-	5	-	-

Total hours	18	18	18	20.8
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Table III.10: VP watch survey hours completed at the 500 m turbine buffer during the 2023-24 non-breeding season

Non-breeding season 2023-24				
Date	VP1	VP2	VP3	VP4
04/09/2023	2	-	-	-
05/09/2023	-	-	-	3
06/09/2023	-	-	-	3
08/09/2023	1	10	-	-
12/09/2023	-	1	-	-
12/10/2023	-	-	5	-
15/10/2023	2.75	-	-	-
01/11/2023	9.5	-	-	-
02/11/2023	1.25	-	10	-
04/11/2023	-	-	3	-
05/11/2023	-	7	1	-
06/11/2023	1	-	-	-
23/11/2023	-	-	-	6
30/11/2023	-	-	-	6
13/12/2023	3	-	3	-
14/12/2023	3	-	3	-
15/12/2023	-	6	-	-
20/12/2023	-	-	-	-
08/01/2024	3	-	3	-
09/01/2024	3	-	3	-
12/01/2024	-	6	-	-
25/01/2024	-	-	-	6
19/02/2024	3	-	6	-
20/02/2024	-	-	-	6
27/02/2024	1	6	-	-
05/03/2024	2	-	-	-
Total hours	35.5	36	37	36

Table III.11: VP watch survey hours completed at the 500 m turbine buffer during the 2024 spring passage season

Spring passage season 2024				
Date	VP1	VP2	VP3	VP4
19/03/2024	-	-	9	-
20/03/2024	9	-	-	-
21/03/2024	-	-	-	9
22/03/2024	-	9	-	-
16/04/2024	6	3	-	-
17/04/2024	3	-	-	-
18/04/2024	-	-	3	-
22/04/2024	3	-	-	-

23/04/2024	-	-	3	-
24/04/2024	-	-	-	6
25/04/2024	-	3	-	-
15/05/2024	-	-	3	-
16/05/2024	-	3	-	-
20/05/2024	-	-	-	3
Total hours	21	18	18	18

Appendix IV - Breeding bird survey effort tables

Table IV.1: Dates, duration, surveyor and weather conditions for walkover surveys during breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind force ¹ above ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Breeding 2021	1	12/05/2021	11:17	6.50	PD	3	SW	5	14	None
Breeding 2021	1	17/05/2021	08:17	8.00	PD	3	NE	6	13	Light showers
Breeding 2021	2	15/06/2021	11:59	5.25	PD	6	W	8	14	Heavy shower
Breeding 2022	1	24/06/2022	12:00	2.50	EH	3	SW	8	14	Heavy shower
Breeding 2022	1	25/06/2022	09:00	6.00	CD	2	SW	8	15	Heavy shower
Breeding 2022	1	26/06/2022	09:15	3.00	EH	3	SW	7	15	Occasional heavy shower
Breeding 2023	1	06/04/2023	14:30	3.00	SM	2	W	2	12	None
Breeding 2023	1	07/04/2023	13:45	5.00	SM	5	S	5	9	Light showers
Breeding 2023	1	11/04/2023	14:15	3.25	SM	3	SW	6	8	Moderate showers
Breeding 2023	2	06/05/2023	05:30	1.25	SM	2	ENE	0	16	None
Breeding 2023	2	07/05/2023	12:26	2.25	SM	1	E	8	11	None
Breeding 2023	2	07/05/2023	15:21	0.50	SM	3	SM	1	12	None
Breeding 2023	2	08/05/2023	18:00	1.75	SM	1	E	8	11	None
Breeding 2023	3	11/06/2023	14:30	2.50	SM	2	E	6	18	None
Breeding 2023	3	12/06/2023	15:20	4.00	SM	2	E	6	18	None
Breeding 2023	3	12/06/2023	19:15	1.75	SM	2	E	6	18	None
Breeding 2023	3	13/06/2023	14:30	1.75	SM	3	E	5	16	None
Breeding 2023	3	13/06/2023	17:00	1.50	SM	3	E	5	16	None
Breeding 2023	4	20/06/2023	18:00	1.50	SM	1	S	0	18	None

Table IV.2: Dates, duration, surveyor and weather conditions for dusk surveys during breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind force ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Breeding 2021	1	28/06/2021	21:42	2.00	PD	3	S	4	14	None
Breeding 2022	1	16/05/2022	19:30	3.00	CD	5	S	1	17	None
Breeding 2022	2	02/06/2022	23:32	1.50	DL	2	E	2	17	None
Breeding 2022	2	06/06/2022	23:31	1.50	DL	3	E	7	16	None
Breeding 2022	3	19/07/2022	23:30	1.50	DL	2	S	6	17	None

² Wind force is measured using the Beaufort Scale (1-12)

³ Cloud cover is measured using oktas (8/8)

Season	Visit	Date	Start time	Duration	Surveyor	Wind force ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Breeding 2023	1	06/04/2023	18:15	1.00	SM	2	W	2	10	None
Breeding 2023	1	06/04/2023	20:20	0.50	SM	2	W	2	8	None
Breeding 2023	1	06/04/2023	20:55	1.00	SM	2	W	2	8	None
Breeding 2023	1	08/04/2023	18:17	1.00	SM	2	W	2	10	None
Breeding 2023	2	05/05/2023	21:15	1.00	SM	3	S	7	12	None
Breeding 2023	2	06/05/2023	21:15	1.00	SM	3	E	7	11	None
Breeding 2023	2	08/05/2023	21:15	1.00	SM	1	E	8	11	None
Breeding 2023	3	05/06/2023	21:50	2.00	SM	2	ENE	0	16	None
Breeding 2023	3	10/06/2023	21:20	1.50	SM	2	E	6	18	None
Breeding 2023	4	09/08/2023	21:00	2.00	DL	1	S	0	18	None

Appendix V - Breeding raptor survey effort table

Table V.1: Dates, duration, surveyor and weather conditions for breeding raptor surveys during breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind Force ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Breeding 2021	1	31/05/2021	12:55	4.00	PD	3	NE	8	16	None
Breeding 2021	2	01/06/2021	09:39	6.00	PD	2	SE	7	13	Showers
Breeding 2022	1	13/06/2022	11:45	2.50	DL	4	W-SW	5	14	None
Breeding 2023	1	28/03/2023	13:00	1.00	DL	4	S	8	10	Showers
Breeding 2023	2	09/04/2023	14:15	4.00	SM	4	S	8	10	Heavy shower
Breeding 2023	2	10/04/2023	12:10	1.00	SM	2	W	2	10	None
Breeding 2023	3	11/06/2023	17:30	2.00	SM	2	S	2	20	None
Breeding 2023	3	12/06/2023	12:25	3.50	SM	2	S	3	19	None
Breeding 2023	3	13/06/2023	13:15	1.00	SM	3	NE	2	18	None
Breeding 2023	3	14/06/2023	18:25	1.50	SM	3	NE	2	16	None
Breeding 2023	4	11/07/2023	14:45	3.00	DL	4	W	7	16	Showers
Breeding 2023	4	11/07/2023	18:00	3.00	DL	4	W	8	14	Showers

Appendix VI - Winter walkover survey effort table

Table VI.1: Dates, duration, surveyor and weather conditions for winter walkover surveys during non-breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind Force ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Non-breeding 2021-22	1	28/10/2021	07:15	6.00	DP	4	SE	8	12	None
Non-breeding 2021-22	1	31/10/2021	10:31	3.25	DP	4	SE/SW	8	10	Showers
Non-breeding 2021-22	2	11/01/2022	08:14	5.75	DP	4	SW	5	9	None
Non-breeding 2021-22	2	12/01/2022	11:15	3.00	DP	4	SW	6	8	None
Non-breeding 2021-22	3	23/02/2022	11:45	3.00	DP	6	SW	9	5	Showers
Non-breeding 2021-22	3	28/02/2022	11:55	3.00	DP	4	SW	4	10	Showers
Non-breeding 2022-23	1	11/10/2022	13:00	0.75	MH	4	S	8	14	None
Non-breeding 2022-23	1	12/10/2022	07:45	2.50	MH	2	W	6	13	None
Non-breeding 2022-23	1	14/10/2022	10:15	3.50	MH	3	SW	3	11	None
Non-breeding 2022-23	1	16/10/2022	07:35	5.00	MH	2	SE	7	10	None
Non-breeding 2022-23	2	08/11/2022	10:30	2.50	MH	3	SW	6	11	None
Non-breeding 2022-23	2	09/11/2022	12:50	2.00	MH	4	SW	8	12	Showers
Non-breeding 2022-23	2	11/11/2022	13:00	2.00	MH	3	SW	5	11	None
Non-breeding 2022-23	2	12/11/2022	10:30	2.00	MH	3	SW	7	12	None
Non-breeding 2022-23	2	14/11/2022	09:00	3.50	MH	3	SE	3	10	None
Non-breeding 2022-23	3	24/02/2023	12:15	6.00	SM	4	S	8	10	None
Non-breeding 2023-24	1	15/10/2023	11:00	3.25	SM	4	SE	3	12	None
Non-breeding 2023-24	1	16/10/2023	08:45	6.50	SM	4	E	4	14	None
Non-breeding 2023-24	2	07/11/2023	10:00	6.00	MH	6	S	5	10	Light showers
Non-breeding 2023-24	2	08/11/2023	10:15	4.00	MH	8	S	6	8	Moderate showers
Non-breeding 2023-24	3	11/01/2024	10:15	6.00	DL	2	E	3	6	None
Non-breeding 2023-24	3	18/01/2024	09:15	6.00	DL	3	NW	2	0	Light showers

Appendix VII - Wintering waterbird survey effort table

Table VII.1: Dates, duration, surveyor and weather conditions for wintering waterbird surveys during non-breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind Force ²	Wind Dir	Cloud (oktas) ³	Temp. (°C)	Rain
Non-breeding 2021-22	1	27/10/2021	10:00	6.00	DP	5	S	8	14	None
Non-breeding 2021-22	1	31/10/2021	13:00	3.00	DP	7	NW	8	8	None
Non-breeding 2021-22	2	15/11/2021	10:30	4.50	DP	3	S	8	10	None
Non-breeding 2021-22	3	30/11/2021	08:30	5.00	DP	4	W/SW	8	10	Showers
Non-breeding 2021-22	4	09/12/2021	11:15	3.00	DP	5	W/SW	8	8	Showers
Non-breeding 2021-22	4	12/12/2021	09:00	5.00	DP	5	SE	8	9	Showers
Non-breeding 2021-22	5	17/01/2022	10:15	6.00	DP	1	E	1	4	None
Non-breeding 2021-22	6	31/01/2022	11:00	3.00	DP	5	SW	8	9	None
Non-breeding 2021-22	6	01/02/2022	11:30	3.00	DP	6	SW	8	10	Frequent showers
Non-breeding 2021-22	7	09/02/2022	12:00	3.00	DP	6	SW	7	6	Showers
Non-breeding 2021-22	7	15/02/2022	10:00	5.50	DP	5	SW	8	6	Showers
Non-breeding 2021-22	8	17/03/2022	08:10	6.00	DP	5	SW	6	12	Showers
Non-breeding 2022-23	1	15/10/2022	11:45	1.15	MH	5	SW	7	11	Frequent showers
Non-breeding 2022-23	2	12/11/2022	09:00	7.00	MH	3	SE	8	13	Light showers
Non-breeding 2022-23	2	17/11/2022	12:00	2.00	MH	3	SE	8	13	Light showers
Non-breeding 2022-23	3	06/12/2022	11:00	2.00	SM	3	NW	2	0	None
Non-breeding 2022-23	3	08/12/2022	10:30	5.00	SM	3	NW	2	0	None
Non-breeding 2022-23	3	09/12/2022	09:15	6.00	SM	3	NW	2	0	None
Non-breeding 2022-23	3	11/12/2022	08:10	4.00	SM	1	SE	3	2	Showers
Non-breeding 2022-23	4	21/01/2023	15:15	1.00	MH	2	SW	8	10	Light showers
Non-breeding 2022-23	4	22/01/2023	08:30	8.50	MH	2	SW	8	10	Light showers
Non-breeding 2022-23	4	25/01/2023	10:30	1.00	MH	2	SW	8	10	Light showers
Non-breeding 2022-23	5	20/02/2023	14:30	1.50	SM	3	SW	8	10	Light showers
Non-breeding 2022-23	5	23/02/2023	09:30	7.50	SM	3	NW	6	7	Light showers
Non-breeding 2022-23	6	04/03/2023	09:30	1.50	MH	1	NE	8	7	Light showers
Non-breeding 2022-23	6	06/03/2023	09:30	3.50	MH	2	NE	8	8	Light showers
Non-breeding 2023-24	1	15/10/2023	14:30	4.25	SM	4	E	4	12	None
Non-breeding 2023-24	1	16/10/2023	15:30	3.00	SM	4	E	4	14	None
Non-breeding 2023-24	2	03/11/2023	13:00	3.00	SM	6	NE	6	12	Showers
Non-breeding 2023-24	2	06/11/2023	11:30	2.00	SM	7	NW	6	12	Showers
Non-breeding 2023-24	3	31/12/2023	09:30	4.75	DL	6	NW	6	8	Showers
Non-breeding 2023-24	4	16/01/2024	10:30	5.00	DL	5	W	4	6	Showers
Non-breeding 2023-24	5	05/03/2024	12:30	5.00	DL	5	SW	3	10	None
Non-breeding 2023-24	6	22/03/2024	10:00	4.00	DL	4	W	3	10	None
Non-breeding 2023-24	6	25/03/2024	10:00	4.00	DL	4	W	6	8	None

APPENDIX VIII - HEN HARRIER ROOST SEARCHES EFFORT TABLE

Table VIII.1: Dates, duration, surveyor and weather conditions for hen harrier roost searches during non-breeding seasons

Season	Visit	Date	Start time	Duration	Surveyor	Wind force ²	Wind Dir	Temp	Rain
Non-breeding 2021-22	1	27/10/2021	17:15	1.50	DP	4-6	S	Mild	Dry
Non-breeding 2021-22	2	15/11/2021	15:10	2.00	DP	0-3	S	Cool	Dry
Non-breeding 2021-22	3	17/12/2021	15:00	2.00	DP	0-3	SW	Cool	Dry
Non-breeding 2021-22	4	27/01/2022	16:10	2.00	DP	4-6	NW	Mild	Dry
Non-breeding 2022-23	1	12/10/2022	17:47	1.50	MH	0-3	W	Mild	Dry
Non-breeding 2022-23	2	14/10/2022	17:48	1.50	MH	4-6	SSW	Mild	Intermittent or Drizzle
Non-breeding 2022-23	3	19/10/2022	17:40	1.50	MH	4-6	E	Mild	Dry
Non-breeding 2022-23	4	09/11/2022	15:50	1.50	MH	4-6	SW	Mild	Intermittent or Drizzle
Non-breeding 2022-23	5	13/11/2022	16:00	1.50	MH	0-3	SSW	Mild	Dry
Non-breeding 2022-23	6	14/11/2022	15:45	1.50	MH	4-6	S	Cool	Intermittent or Drizzle
Non-breeding 2022-23	7	21/01/2023	15:52	1.50	MH	4-6	SSW	Mild	Intermittent or Drizzle
Non-breeding 2022-23	8	29/01/2023	16:05	1.50	MH	4-6	WSW	Mild	Intermittent or Drizzle
Non-breeding 2022-23	9	30/01/2023	16:15	1.50	MH	4-6	SW	Cool	Intermittent or Drizzle
Non-breeding 2022-23	10	23/02/2023	17:14	1.00	SLM	3	NW	Cool	Light Showers
Non-breeding 2022-23	11	02/03/2023	17:23	1.50	MH	0-3	NE	Cool	Dry
Non-breeding 2022-23	12	05/03/2023	17:25	1.50	MH	1-3	NW	Cool	Showers
Non-breeding 2023-24	1	08/01/2024	15:00	1.50	DL	4-6	SE	Cool	Dry
Non-breeding 2023-24	2	10/01/2024	15:50	1.50	DL	0-3	E	Cool	Dry
Non-breeding 2023-24	3	16/01/2024	16:05	1.50	DL	0-3	N	Cool	Dry
Non-breeding 2023-24	4	27/02/2024	17:30	1.50	DL	0-3	E	Cool	Dry

Appendix IX - VP data including flight line tables and maps for each target species

Table IX.1: VP watch data for common gull

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	4	22/07/2021	12:58	Common gull	2	10	B	580			Landed in field
2	4	10/11/2022	11:18	Common gull	2	10	B	5			Landed in field
3	4	17/11/2022	09:59	Common gull	1	25	B	5			
4	2	05/07/2023	15:14	Common gull	1	70	B	45			Flying
5	2	05/07/2023	17:30	Common gull	1	80	B	64			
6	3	09/01/2024	12:35	Common gull	1	15	B	10			

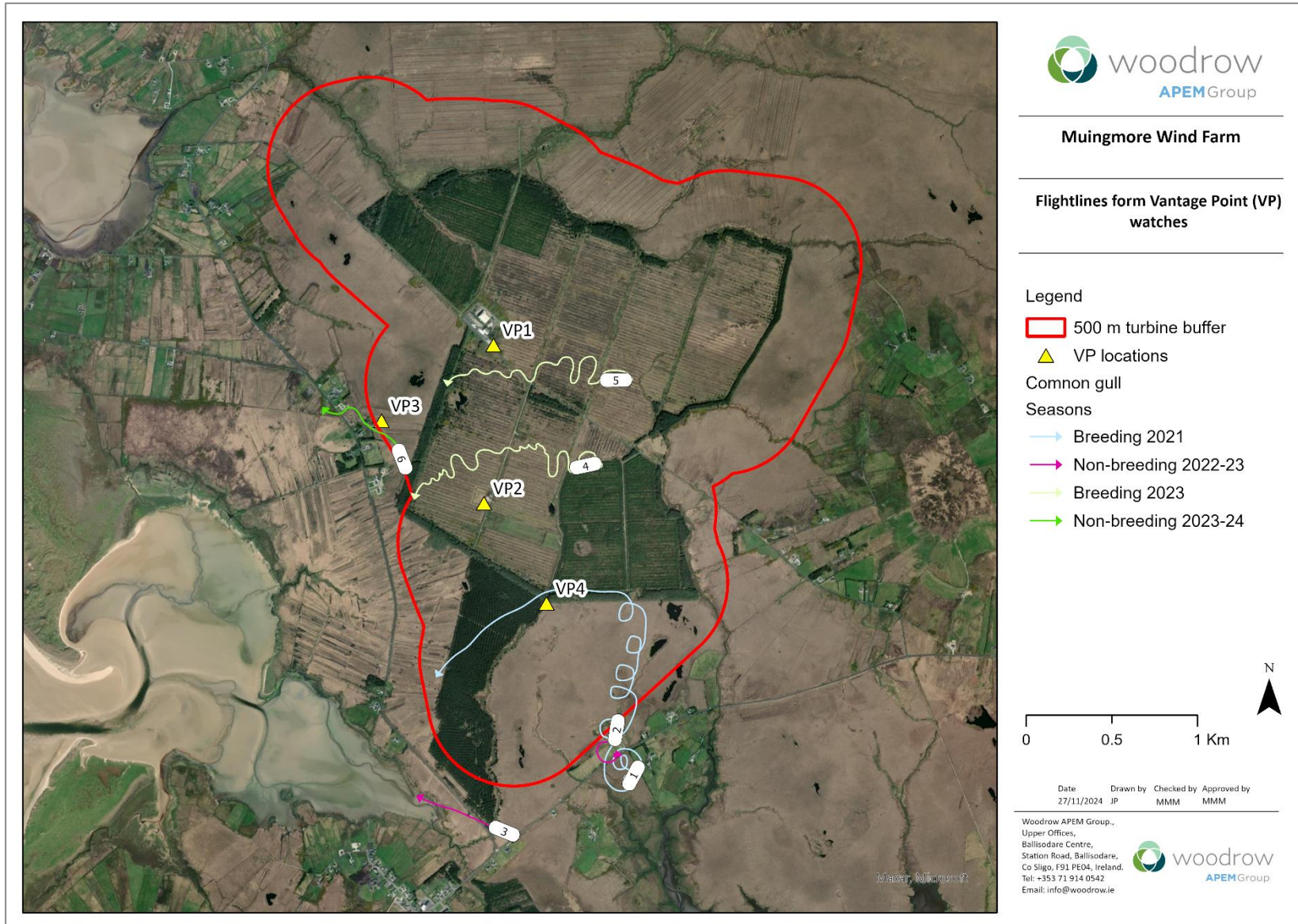


Figure IX.1: Common gull flightlines from VP watches

Table IX.2: VP watch data for black-headed gull

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	10/06/2021	11:50	Black-headed gull	1	5	A	56			
2	1	10/06/2021	13:05	Black-headed gull	1	30	B	56			
3	1	17/06/2021	12:33	Black-headed gull	1	30	B	21			Flying
4	1	17/06/2021	12:34	Black-headed gull	1	5	A	45			Took off flying then landed again
5	2	09/06/2021	14:50	Black-headed gull	1	20	B	63			
6	2	28/06/2021	16:35	Black-headed gull	2	30	B	190			
7	2	28/06/2021	16:56	Black-headed gull	1	20	B	109			
8	2	01/07/2021	14:11	Black-headed gull	1	30	B	39			
9	2	14/07/2021	10:44	Black-headed gull	1	30	B	87			
10	2	14/07/2021	12:15	Black-headed gull	1	30	B	121			Circled near small lake
11	3	09/06/2021	10:56	Black-headed gull	1	5	A	56			Headed towards the coast
12	3	09/06/2021	11:08	Black-headed gull	1	30	B	70			
13	3	09/06/2021	11:19	Black-headed gull	1	5	A	27			
14	3	09/06/2021	11:21	Black-headed gull	1	5	A	40			Flying above treeline
15	3	09/06/2021	11:30	Black-headed gull	1	5	A	9			Staying around a small lake
16	3	09/06/2021	11:53	Black-headed gull	1	15	B	37			
17	3	09/06/2021	12:47	Black-headed gull	2	25	B	80			Landed back in a small lake
18	3	09/06/2021	13:07	Black-headed gull	1	10	B	15			Came from a small lake
19	3	21/06/2021	11:02	Black-headed gull	1	30	B	81			
20	3	21/06/2021	11:04	Black-headed gull	1	30	B	5			Flew toward old factory
21	3	21/06/2021	11:12	Black-headed gull	1	20	B	70			
22	3	21/06/2021	11:20	Black-headed gull	1	20	B	33			
23	3	21/06/2021	11:22	Black-headed gull	1	20	B	32			
24	3	21/06/2021	11:45	Black-headed gull	1	10	B	10			
25	3	21/06/2021	11:51	Black-headed gull	1	10	B	90			
26	3	21/06/2021	12:05	Black-headed gull	1	10	B	31			
27	3	28/06/2021	14:18	Black-headed gull	1	30	B	53			

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
28	3	28/06/2021	14:54	Black-headed gull	1	30	B	115			
29	3	13/07/2021	09:41	Black-headed gull	1	20	B	24			Flying low over heather
30	4	08/06/2021	11:15	Black-headed gull	2	10	B	116			Heard calling and then flying
31	4	08/06/2021	11:16	Black-headed gull	1	10	B	32			
32	4	08/06/2021	11:48	Black-headed gull	1	30	B	44			
33	4	08/06/2021	12:35	Black-headed gull	1	10	B	11			
34	4	08/06/2021	13:26	Black-headed gull	1	10	B	42			
35	4	08/06/2021	13:35	Black-headed gull	1	30	B	34			
36	4	10/06/2021	14:03	Black-headed gull	1	10	B	15			
37	4	10/06/2021	14:12	Black-headed gull	1	10	B	46			
38	4	10/06/2021	14:59	Black-headed gull	1	50	B	48			Disappeared out of sight
39	4	10/06/2021	15:50	Black-headed gull	1	5	A	4			
40	4	10/06/2021	15:52	Black-headed gull	1	30	B	51			
41	4	10/06/2021	15:59	Black-headed gull	1	25	B	15			
42	4	10/06/2021	16:26	Black-headed gull	1	5	A	13			
43	4	21/06/2021	15:58	Black-headed gull	1	15	B	100			
44	4	21/06/2021	16:09	Black-headed gull	1	30	B	100			
45	4	21/06/2021	16:51	Black-headed gull	1	5	A	45			
46	4	21/06/2021	16:58	Black-headed gull	1	30	B	16			
47	4	14/07/2021	13:50	Black-headed gull	1	5	A	37			
48	1	06/07/2022	10:46	Black-headed gull	1	40	B	90			
49	1	06/07/2022	12:29	Black-headed gull	3	25	B	90			Disappeared behind tree line
50	2	16/05/2022	12:53	Black-headed gull	1	25	B	70			
51	3	17/05/2022	15:52	Black-headed gull	2	10	B	5			
52	4	26/06/2022	11:49	Black-headed gull	1	30	B	5			
53	4	26/06/2022	13:52	Black-headed gull	2	10	B	260			
54	4	11/10/2022	11:56	Black-headed gull	1	25	B	15			

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
55	4	16/10/2022	11:19	Black-headed gull	2	20	B	60			Dropped out of view
56	4	10/11/2022	11:29	Black-headed gull	1	12	B	25			
57	2	10/06/2023	11:24	Black-headed gull	1	20	B	40			
58	2	10/06/2023	17:25	Black-headed gull	1	12	B	70			
59	2	05/07/2023	15:42	Black-headed gull	1	80	B	51			
60	3	04/05/2023	13:10	Black-headed gull	1	30	B	90			
61	3	04/05/2023	17:45	Black-headed gull	1	15	B	110			Dropped behind pine belt
62	3	07/06/2023	16:21	Black-headed gull	1	20	B	65			
63	3	07/06/2023	17:36	Black-headed gull	1	20	B	25			
64	3	07/06/2023	18:21	Black-headed gull	1	25	B	45			
65	4	08/06/2023	12:59	Black-headed gull	1	10	B	35			
66	4	08/06/2023	17:49	Black-headed gull	1	10	B	45			
67	4	08/06/2023	18:51	Black-headed gull	2	3	A	2,520			Feeding over small pools NE
68	4	08/06/2023	18:58	Black-headed gull	1	35	B	70			Flew directly E
69	2	03/11/2023	11:07	Black-headed gull	1	15	B	20			
70	4	20/5/2024	17:02	Black-headed gull	1	20	B	124		Ad	Flying

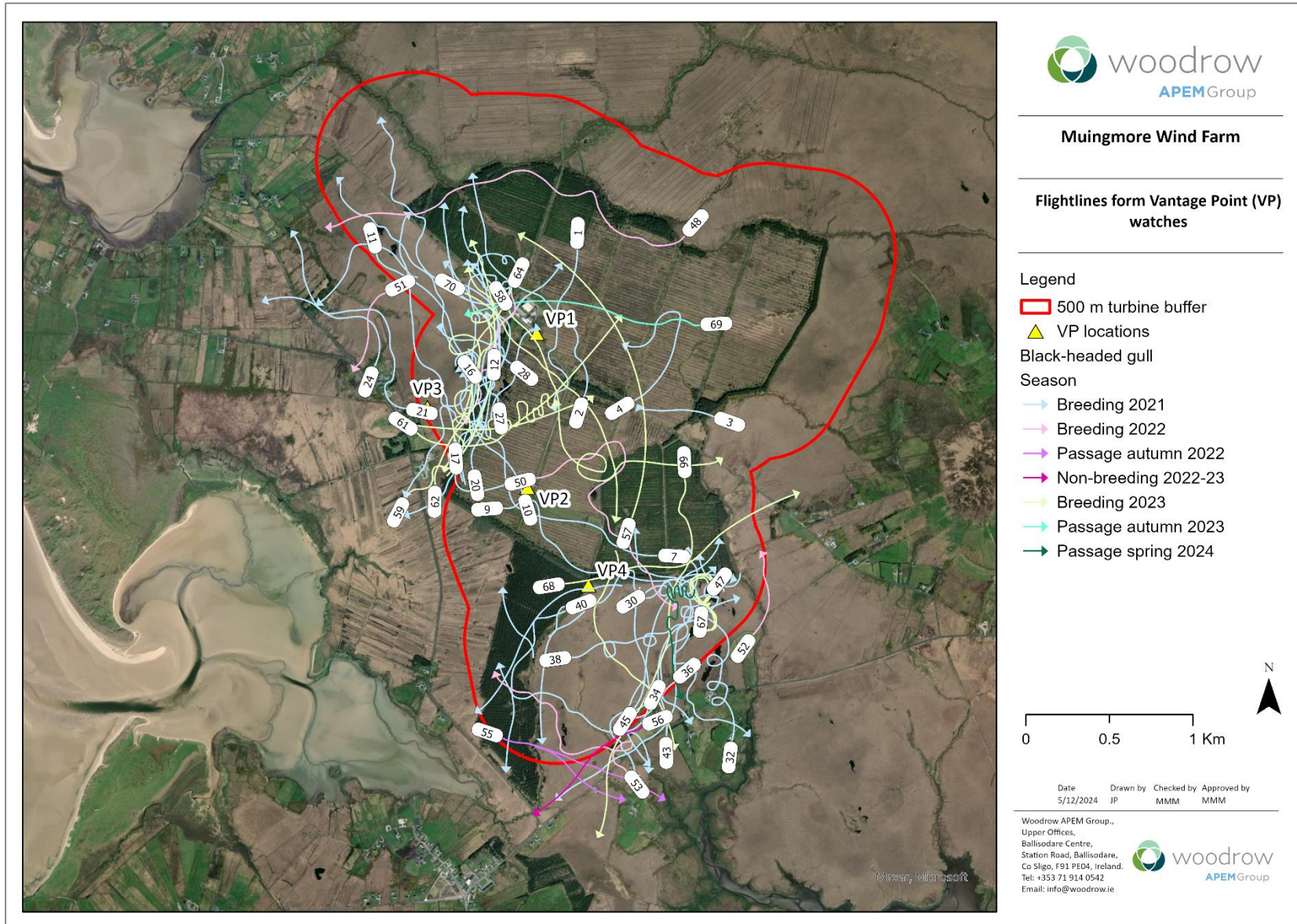


Figure IX.2: Black-headed gull flightlines from VP watches

Table IX.3: VP watch data for great black-backed gull

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	27/4/2021	15:58	Great black-backed gull	1	25	B	41			Flying
2	1	28/4/2021	16:13	Great black-backed gull	1	20	B	5			Flying
3	1	12/7/2021	15:04	Great black-backed gull	1	40	B	230			Circling
4	1	12/8/2021	10:53	Great black-backed gull	1	10	B	132			Flying
5	2	27/4/2021	12:49	Great black-backed gull	1	40	B	41			Flying
6	2	14/7/2021	11:07	Great black-backed gull	1	30	B	69			Flying
7	3	28/4/2021	11:50	Great black-backed gull	1	50	B	80			Flying
8	4	12/7/2021	11:34	Great black-backed gull	1	30	B	8			Circling
9	4	12/7/2021	11:40	Great black-backed gull	1	50	B	32			Circling
10	4	12/7/2021	12:10	Great black-backed gull	1	40	B	67			Flying
11	4	18/8/2021	16:23	Great black-backed gull	1	35	B	65			Flying
12	1	19/11/2021	8:44	Great black-backed gull	1	25	B	174		A	Commuting
13	1	19/1/2022	12:07	Great black-backed gull	1	35	B	92		J	Commuting
14	1	19/1/2022	12:49	Great black-backed gull	1	50	B	72		A	Commuting
15	3	17/2/2022	10:41	Great black-backed gull	2	40	B	20		A	Commuting
16	4	14/10/2021	9:59	Great black-backed gull	1	35	B	22			Commuting
17	4	24/11/2021	11:58	Great black-backed gull	1	20	B	5		A	Commuting
18	4	29/11/2021	12:08	Great black-backed gull	1	50	B	17		A	Commuting
19	4	12/1/2022	9:32	Great black-backed gull	1	40	B	40		A	Commuting
20	4	12/1/2022	11:12	Great black-backed gull	1	35	B	36		A	Commuting
21	4	23/2/2022	9:08	Great black-backed gull	1	25	B	17		A	Commuting
22	2	16/5/2022	11:09	Great black-backed gull	1	30	B	120		A	Commuting
23	2	18/8/2022	12:19	Great black-backed gull	1	25	B	97		A	Commuting
24	3	2/6/2022	18:20	Great black-backed gull	1	20	B	5		A	Commuting
25	3	13/6/2022	14:03	Great black-backed gull	1	20	B	35		A	Flying
26	3	8/8/2022	15:56	Great black-backed gull	1	10	B	30		A	Flying
27	4	21/4/2022	17:00	Great black-backed gull	2	50	B	4		A	Commuting

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	4	26/6/2022	14:30	Great black-backed gull	1	10	B	10		A	Flying
29	4	27/7/2022	16:15	Great black-backed gull	1	15	B	28		A	Commuting
30	4	27/7/2022	17:58	Great black-backed gull	1	10	B	4		A	Flying
31	4	29/8/2022	17:02	Great black-backed gull	1	23	B	40		A	Commuting
32	1	8/2/2023	13:46	Great black-backed gull	1	25	B	40		Ad	Flying
33	2	8/2/2023	10:35	Great black-backed gull	3	25	B	1440		Ad	Hunting
34	2	8/2/2023	10:52	Great black-backed gull	2	35	B	360		Ad	Gliding
35	2	8/2/2023	11:41	Great black-backed gull	1	20	B	0		Ad	Commuting
36	2	8/2/2023	12:29	Great black-backed gull	1	30	B	45		Ad	Gliding
37	2	8/2/2023	12:18	Great black-backed gull	2	35	B	0		Ad	Flying
38	3	19/2/2023	12:01	Great black-backed gull	1	25	B	35		Ad	Present
39	4	19/2/2023	15:11	Great black-backed gull	1	30	B	65		Ad	Present
40	2	12/10/2022	12:24	Great black-backed gull	1	60	B	270		J	Commuting
41	1	6/4/2023	11:04	Great black-backed gull	1	30	B	4		Ad	Present
42	1	7/4/2023	13:43	Great black-backed gull	1	12	B	105		Ad	Present
43	2	10/4/2023	13:31	Great black-backed gull	2	30	B	6		Ad	Present
44	2	10/4/2023	13:52	Great black-backed gull	1	20	B	4		Ad	Present
45	2	10/4/2023	14:26	Great black-backed gull	1	30	B	180		Ad	Present
46	2	10/4/2023	14:26	Great black-backed gull	1	25	B	20		Ad	Present
47	2	10/4/2023	18:03	Great black-backed gull	1	10	B	25		Ad	Present
48	3	4/4/2023	12:28	Great black-backed gull	1	12	B	15		Ad	Flying
49	4	5/4/2023	14:45	Great black-backed gull	4	25	B	1,000		Ad	Present
50	4	5/4/2023	18:04	Great black-backed gull	1	30	B	125		Ad	Flying
51	1	6/5/2023	15:18	Great black-backed gull	1	15	B	180		Ad	Present
52	2	5/3/2023	11:51	Great black-backed gull	1	80	B	195			Flying
53	2	7/5/2023	10:16	Great black-backed gull	1	15	B	45		Ad	Present
54	2	7/5/2023	12:15	Great black-backed gull	2	15	B	220		Ads	Present
55	3	4/5/2023	16:46	Great black-backed gull	2	80	B	240		Ads	Present

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
56	4	1/3/2023	9:11	Great black-backed gull	1	60	B	5		Ad	Flying
57	4	6/3/2023	17:57	Great black-backed gull	1	50	B	105			Flying
58	4	5/5/2023	15:59	Great black-backed gull	1	20	B	30		Ad	Present
59	4	9/8/2023	18:12	Great black-backed gull	1	60	B	10		Ad	Commuting
60	4	9/8/2023	18:48	Great black-backed gull	1	60	B	0		Ad	Commuting
61	1	1/11/2023	7:34	Great black-backed gull	1	25	B	25		Ad	Present
62	1	5/3/2024	11:33	Great black-backed gull	2	10	B	120		Ad	Feeding
63	1	5/3/2024	11:46	Great black-backed gull	2	10	B	130		Ad	Fly-land
64	4	21/3/2024	12:47	Great black-backed gull	1	2	A	4		Ad	Present
65	4	21/3/2024	15:03	Great black-backed gull	1	3	A	5		Ad	Present

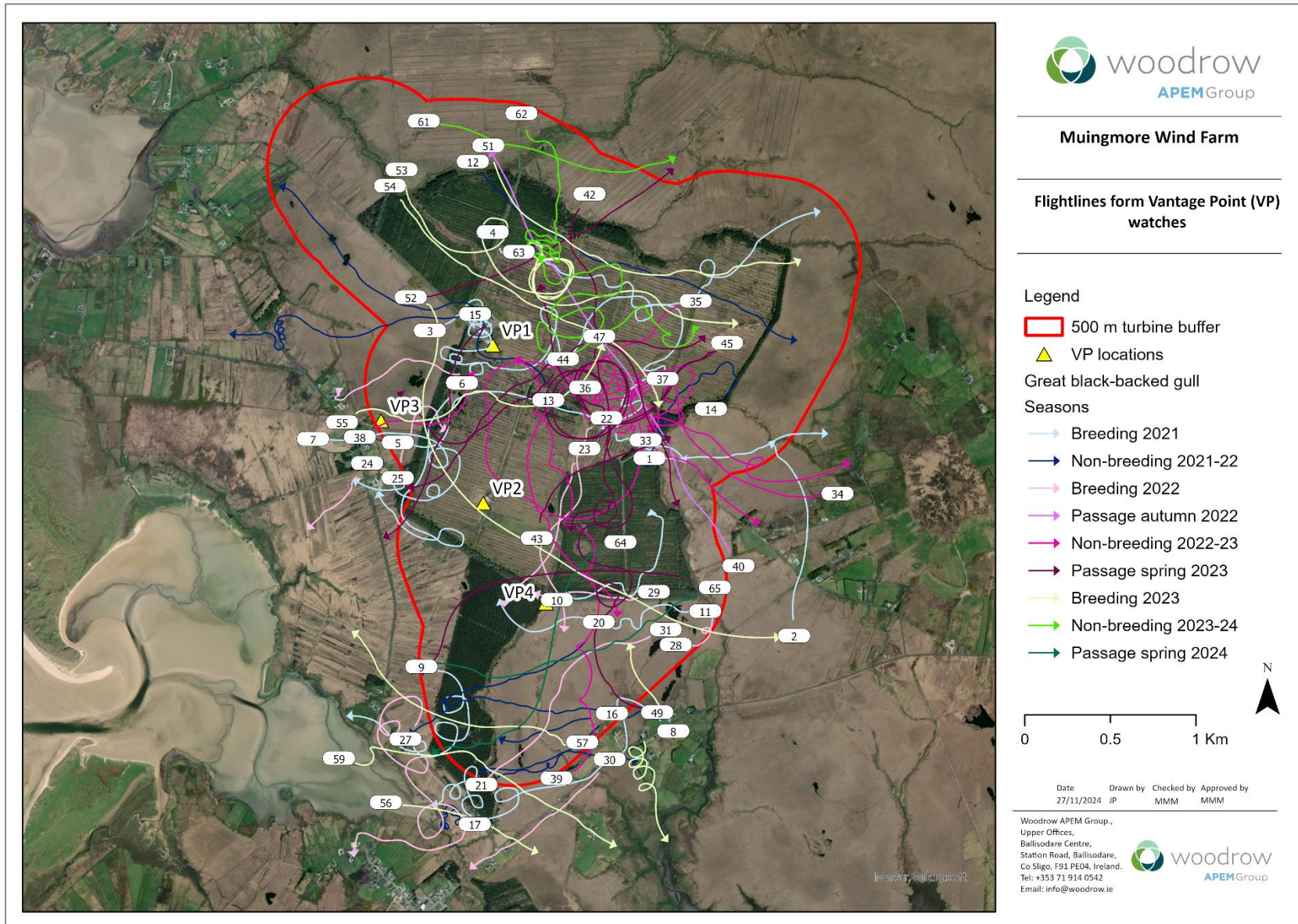


Figure IX.3: Great black-backed gull flightlines from VP watches

Table IX.4: VP watch data for lesser black-backed gull

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	27/4/2021	15:48	Lesser black-backed gull	2	70	B	30			Soaring
2	1	27/4/2021	16:08	Lesser black-backed gull	1	20	B	28			Flying
3	1	27/4/2021	16:53	Lesser black-backed gull	1	40	B	10			Flying
4	1	27/4/2021	17:05	Lesser black-backed gull	1	40	B	119			Flying
5	1	27/4/2021	17:19	Lesser black-backed gull	1	50	B	65			Soaring
6	1	28/4/2021	14:50	Lesser black-backed gull	1	60	B	62			Flying
7	1	28/4/2021	15:01	Lesser black-backed gull	1	60	B	20			Flying
8	1	28/4/2021	16:15	Lesser black-backed gull	1	50	B	30			Flying
9	1	28/4/2021	16:52	Lesser black-backed gull	1	40	B	63			Flying
10	1	8/6/2021	15:25	Lesser black-backed gull	1	20	B	81			Circling
11	1	8/6/2021	16:33	Lesser black-backed gull	1	20	B	38			Flying
12	1	10/6/2021	12:27	Lesser black-backed gull	2	80	B	98			Circling
13	1	10/6/2021	12:40	Lesser black-backed gull	1	70	B	37			Circling
14	1	17/6/2021	12:23	Lesser black-backed gull	1	10	B	109			Flying
15	1	17/6/2021	13:06	Lesser black-backed gull	1	30	B	85			Flying
16	1	12/7/2021	15:05	Lesser black-backed gull	1	30	B	133			Circling
17	1	12/8/2021	10:37	Lesser black-backed gull	1	25	B	57			Flying
18	1	12/8/2021	12:17	Lesser black-backed gull	1	5	A	29			Flying
19	2	10/5/2021	12:00	Lesser black-backed gull	3	40	B	126			Flying
20	2	9/6/2021	16:24	Lesser black-backed gull	1	30	B	24			Flying
21	2	9/6/2021	16:52	Lesser black-backed gull	1	10	B	96			Flying
22	2	9/6/2021	16:58	Lesser black-backed gull	3	30	B	285		Ad, Juv	Flying
23	2	17/6/2021	15:16	Lesser black-backed gull	1	30	B	87			Circling
24	2	1/7/2021	11:49	Lesser black-backed gull	1	40	B	63			Flying
25	2	14/7/2021	10:48	Lesser black-backed gull	1	5	A	78			Flying
26	3	28/4/2021	10:18	Lesser black-backed gull	1	25	B	140			Flying
27	3	10/5/2021	14:37	Lesser black-backed gull	1	25	B	66			Flying

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	3	10/5/2021	16:32	Lesser black-backed gull	2	30	B	6			Flying
29	3	21/6/2021	11:18	Lesser black-backed gull	1	5	A	28			Flying
30	3	14/7/2021	16:24	Lesser black-backed gull	1	30	B	14			Flying
31	3	15/7/2021	10:05	Lesser black-backed gull	1	40	B	55			Flying
32	3	15/7/2021	10:09	Lesser black-backed gull	1	20	B	5			Flying
33	3	15/7/2021	10:10	Lesser black-backed gull	1	20	B	5			Flying
34	3	15/7/2021	10:32	Lesser black-backed gull	1	20	B	5			Flying
35	3	15/7/2021	11:00	Lesser black-backed gull	1	30	B	196			Flying
36	3	19/7/2021	17:31	Lesser black-backed gull	1	35	B	45			Flying
37	3	21/7/2021	13:02	Lesser black-backed gull	1	20	B	2			Flying
38	3	10/8/2021	10:53	Lesser black-backed gull	1	15	B	5			Flying
39	3	10/8/2021	11:05	Lesser black-backed gull	1	5	A	19			Flying
40	3	10/8/2021	11:07	Lesser black-backed gull	1	5	A	17			Circling
41	4	8/6/2021	11:03	Lesser black-backed gull	1	50	B	35			Flying
42	4	8/6/2021	11:43	Lesser black-backed gull	1	40	B	31			Flying
43	4	8/6/2021	12:23	Lesser black-backed gull	1	50	B	70			Flying
44	4	8/6/2021	13:16	Lesser black-backed gull	1	30	B	41			Flying
45	4	10/6/2021	16:20	Lesser black-backed gull	1	40	B	33			circling
46	4	21/6/2021	17:08	Lesser black-backed gull	1	10	B	5			Flying
47	4	14/7/2021	13:56	Lesser black-backed gull	1	20	B	52			Flying
48	4	19/7/2021	14:42	Lesser black-backed gull	1	15	B	21			Flying
49	4	19/7/2021	15:41	Lesser black-backed gull	1	70	B	110			Circling
50	4	19/7/2021	15:46	Lesser black-backed gull	1	20	B	32			Flying
51	4	22/7/2021	12:23	Lesser black-backed gull	1	30	B	34			Flying
52	4	10/8/2021	14:07	Lesser black-backed gull	1	40	B	87			Flying
53	4	10/8/2021	14:07	Lesser black-backed gull	1	40	B	40			Flying
54	1	25/6/2022	11:50	Lesser black-backed gull	1	15	B	60		Ad	Flying
55	1	25/6/2022	11:55	Lesser black-backed gull	1	40	B	37		Ad	Flying

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
56	1	25/6/2022	14:15	Lesser black-backed gull	1	30	B	30		Ad	Flying
57	2	24/6/2022	15:10	Lesser black-backed gull	1	15	B	70		Ad	Commuting
58	3	27/4/2022	16:20	Lesser black-backed gull	2	100	B	5		Ad	Commuting
59	3	13/6/2022	13:03	Lesser black-backed gull	1	18	B	50		Ad	Gliding
60	3	13/6/2022	15:52	Lesser black-backed gull	1	20	B	20			Flying
61	3	13/6/2022	17:14	Lesser black-backed gull	1	20	B	15			Gliding
62	4	26/6/2022	13:47	Lesser black-backed gull	1	5	A	45		Ad	Flying
63	4	26/6/2022	15:21	Lesser black-backed gull	2	15	B	240		Ad	Commuting
64	1	25/1/2023	14:18	Lesser black-backed gull	2	40	B	250		Ad	Commuting
65	2	11/4/2023	18:49	Lesser black-backed gull	3	2	A	90		Ad	Present
66	4	9/4/2023	12:32	Lesser black-backed gull	3	30	B	75		Ad	Flying
67	1	9/6/2023	16:09	Lesser black-backed gull	2	40	B	8		Ad	Present
68	2	7/5/2023	13:01	Lesser black-backed gull	2	18	B	1,000		Ad	Present
69	2	7/5/2023	13:12	Lesser black-backed gull	1	25	B	90		Ad	Present
70	2	10/6/2023	17:01	Lesser black-backed gull	1	45	B	50		Ad	Present
71	3	4/5/2023	17:56	Lesser black-backed gull	1	10	B	30		Ad	Present
72	3	4/5/2023	17:58	Lesser black-backed gull	1	25	B	125		Ad	Present
73	3	7/6/2023	11:38	Lesser black-backed gull	1	10	B	10		Ad	Present
74	3	7/6/2023	11:46	Lesser black-backed gull	1	25	B	45		Ad	Present
75	3	7/6/2023	16:05	Lesser black-backed gull	2	30	B	80		Ad	Present
76	4	8/6/2023	17:02	Lesser black-backed gull	2	15	B	170		Ad	Present
77	1	7/9/2023	17:09	Lesser black-backed gull	1	20	B	45		Ad	Present
78	1	14/10/2023	12:21	Lesser black-backed gull	1	25	B	65		Ad	Flying
79	2	31/10/2023	16:01	Lesser black-backed gull	1	15	B	50		Ad	Present
80	4	5/9/2023	15:31	Lesser black-backed gull	1	15	B	190		Ad	Present
81	4	6/9/2023	13:22	Lesser black-backed gull	1	23	B	30		Ad	Present
82	1	16/4/2024	8:49	Lesser black-backed gull	2	30	B	74		Ad	Flying
83	1	16/4/2024	12:41	Lesser black-backed gull	1	30	B	136		Ad	Flying

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
84	1	16/4/2024	13:25	Lesser black-backed gull	1	80	B	379		Ad	Flying
85	1	22/4/2024	14:50	Lesser black-backed gull	2	30	B	186		Ad	Flying
86	2	16/4/2024	16:04	Lesser black-backed gull	2	20	B	442		Ad	Flying
87	2	17/4/2024	9:41	Lesser black-backed gull	2	40	B	188		Ad	Flying
88	2	17/4/2024	11:30	Lesser black-backed gull	1	30	B	54		Ad	Flying
89	3	18/4/2024	10:30	Lesser black-backed gull	5	30	B	980		Ad	Flying
90	1	22/4/2024	14:50	Lesser black-backed gull	2	30	B	186		Ad	Flying
91	3	23/4/2024	16:57	Lesser black-backed gull	1	40	B	79		Ad	Flying
92	2	25/4/2024	9:33	Lesser black-backed gull	3	50	B	243		Ad	Flying

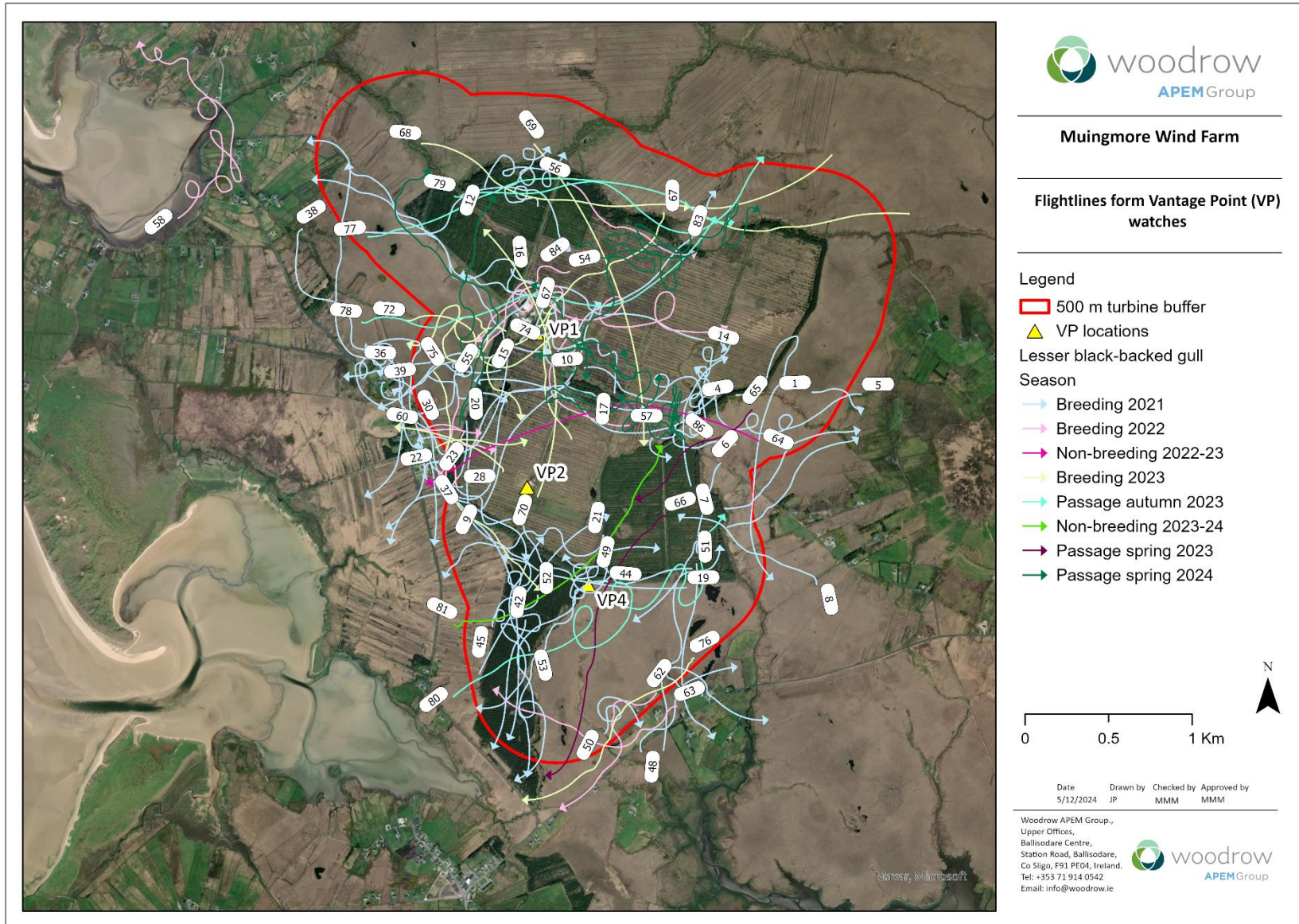


Figure IX.4: Lesser black-backed gull flightlines from VP watches

Table IX.5: VP watch data for herring gull

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	8/6/2021	16:32	Herring gull	1	30	B	9			Flying
2	2	9/6/2021	14:50	Herring gull	1	20	B	22			Flying
3	2	9/6/2021	15:15	Herring gull	1	25	B	56			Flying
4	2	1/7/2021	14:11	Herring gull	1	40	B	45			Circling
5	2	14/7/2021	10:49	Herring gull	1	30	B	49			Flying
6	2	14/7/2021	11:34	Herring gull	1	30	B	61			Flying
7	3	10/8/2021	11:18	Herring gull	1	10	B	6			Flying
8	4	8/6/2021	12:56	Herring gull	1	20	B	90			Flying
9	4	8/6/2021	13:02	Herring gull	1	30	B	21			Flying
10	4	10/6/2021	15:52	Herring gull	1	10	B	5			Flying
11	4	10/6/2021	16:16	Herring gull	1	25	B	12			Flying
12	4	10/6/2021	16:24	Herring gull	1	5	A	6			Flying
13	4	21/6/2021	15:55	Herring gull	1	5	A	6			Circling
14	4	21/6/2021	16:55	Herring gull	2	10	B	108			Flying
15	4	21/6/2021	16:58	Herring gull	2	10	B	98			Circling
16	4	21/6/2021	17:08	Herring gull	1	10	B	5			Flying
17	1	6/7/2022	10:19	Herring gull	1	50	B	135		A	Commuting
18	1	19/7/2022	14:13	Herring gull	1	40	B	80		A	Commuting
19	2	14/4/2022	17:42	Herring gull	1	50	B	36		J	Commuting
20	2	28/4/2022	15:46	Herring gull	1	100	B	5		J	Commuting
21	2	16/5/2022	12:20	Herring gull	1	40	B	100		J	Commuting
22	3	27/4/2022	14:45	Herring gull	1	15	B	10		A	Hunting
23	3	17/5/2022	14:46	Herring gull	1	5	A	5		A	Commuting
24	3	13/6/2022	12:10	Herring gull	1	10	B	10		A	Gliding
25	3	13/6/2022	14:26	Herring gull	2	20	B	110		A	Flying
26	3	13/6/2022	15:36	Herring gull	2	20	B	150			Flying
27	3	13/6/2022	17:09	Herring gull	1	7	A	18			Fly-land

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	3	19/7/2022	10:20	Herring gull	1	20	B	10		A	Commuting
29	3	19/7/2022	10:53	Herring gull	1	10	B	60		A	Commuting
30	3	8/8/2022	15:26	Herring gull	1	10	B	5		A	Fly-land
31	3	8/8/2022	15:26	Herring gull	1	0	-	-		A	Perched
32	3	8/8/2022	15:28	Herring gull	1	10	B	5		A	Fly-land
33	3	8/8/2022	15:28	Herring gull	1	0	-	-		A	Perched
34	3	8/8/2022	15:45	Herring gull	1	0	-	-		A	Perched
35	3	8/8/2022	16:01	Herring gull	1	10	B	10		A	Flying
36	3	8/8/2022	16:36	Herring gull	1	20	B	5		A	Flying
37	4	26/6/2022	12:19	Herring gull	1	35	B	60		A	Commuting
38	4	26/6/2022	12:47	Herring gull	1	5	A	2		A	Flying
39	4	27/7/2022	13:01	Herring gull	1	15	B	5		A	Commuting
40	4	27/7/2022	14:34	Herring gull	1	10	B	5		A	Flying
41	4	27/7/2022	15:00	Herring gull	1	10	B	2		A	Flying
42	4	27/7/2022	16:57	Herring gull	1	10	B	25		A	Flying
43	4	27/7/2022	16:58	Herring gull	1	10	B	5		A	Flying
44	4	27/7/2022	17:30	Herring gull	1	10	B	5		A	Flying
45	4	27/7/2022	18:50	Herring gull	1	50	B	40		A	Flying
46	3	19/10/2022	10:19	Herring gull	1	15	B	55		J	Commuting
47	4	13/10/2022	12:39	Herring gull	1	20	B	80		J	Commuting
48	4	8/3/2023	15:47	Herring gull	1	30	B	35			Flying
49	4	5/4/2023	14:46	Herring gull	1	40	B	60		Ad	Flying
50	3	25/7/2023	13:45	Herring gull	3	90	B	105			Flying
51	3	25/7/2023	13:49	Herring gull	1	90	B	17			Flying
52	3	25/7/2023	14:23	Herring gull	2	100	B	120			Flying
53	3	26/7/2023	14:21	Herring gull	5	80	B	115		Ad	Flying
54	3	1/8/2023	15:25	Herring gull	1	25	B	10		Ad	Commuting
55	4	8/6/2023	10:16	Herring gull	1	15	B	70		Ad	Present

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
56	4	8/6/2023	14:40	Herring gull	2	40	B	100		Ad	Present
57	4	25/7/2023	10:32	Herring gull	1	80	B	10		Ad	Flying
58	4	25/7/2023	10:52	Herring gull	2	50	B	50		Ad	Flying
59	4	25/7/2023	11:33	Herring gull	4	100	B	92		Ad	Flying
60	4	25/7/2023	11:54	Herring gull	5	90	B	185		Ad	Flying
61	4	26/7/2023	11:15	Herring gull	1	80	B	17			Flushed
62	2	3/11/2023	10:21	Herring gull	1	30	B	20		Ad	Flying
63	2	3/11/2023	10:22	Herring gull	1	25	B	75		Ad	Flying
64	2	22/3/2024	10:21	Herring gull	1	20	B	45		Ad	Present

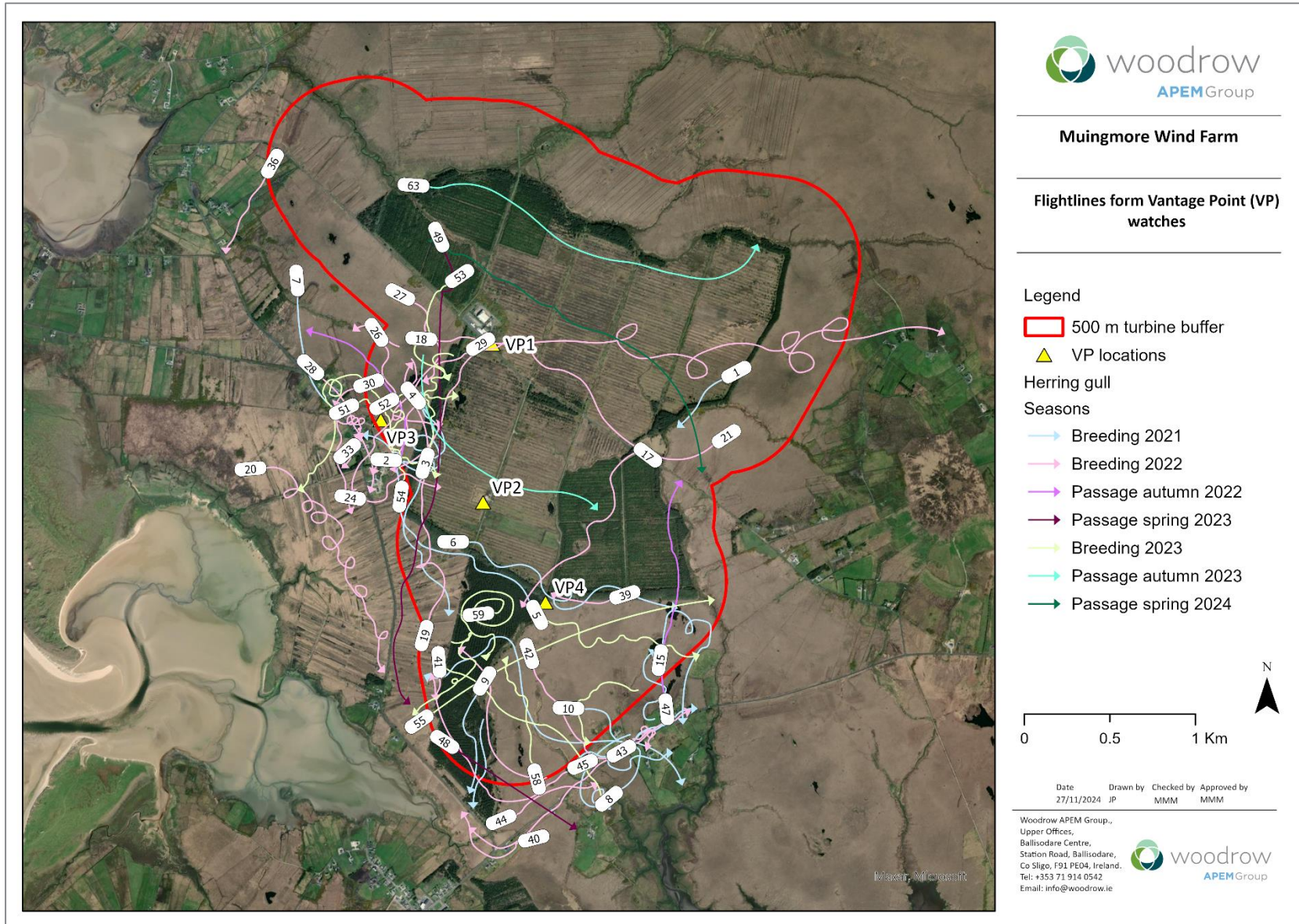


Figure IX.5: Herring gull flightlines from VP watches

Table IX.6: VP watch data for common tern

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	3	13/06/2022	15:38	Common tern	1	25	B	30			Flying
2	3	13/06/2022	17:37	Common tern	1	11	B	24			Flying

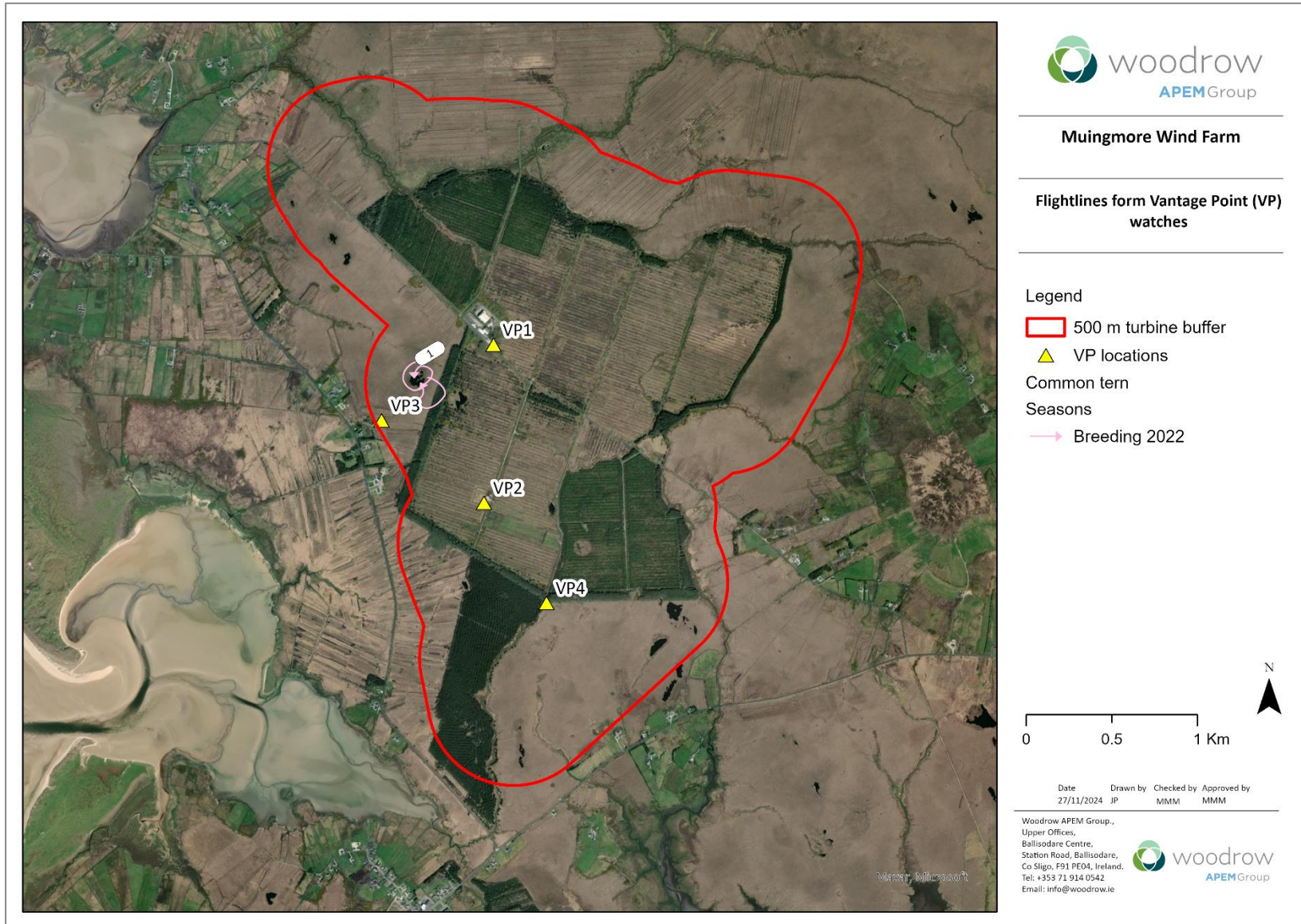


Figure IX.6: Common tern flightlines from VP watches

Table IX.7: VP watch data for cormorant

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	13/10/2022	10:20	Cormorant	1	35	B	160			Flying
2	2	25/01/2023	09:37	Cormorant	1	40	B	165			Flying
3	4	13/10/2022	13:13	Cormorant	1	50	B	45			Commuting
4	4	16/10/2022	08:22	Cormorant	1	40	B	25			Flying
5	3	05/03/2023	08:23	Cormorant	1	45	B	115			

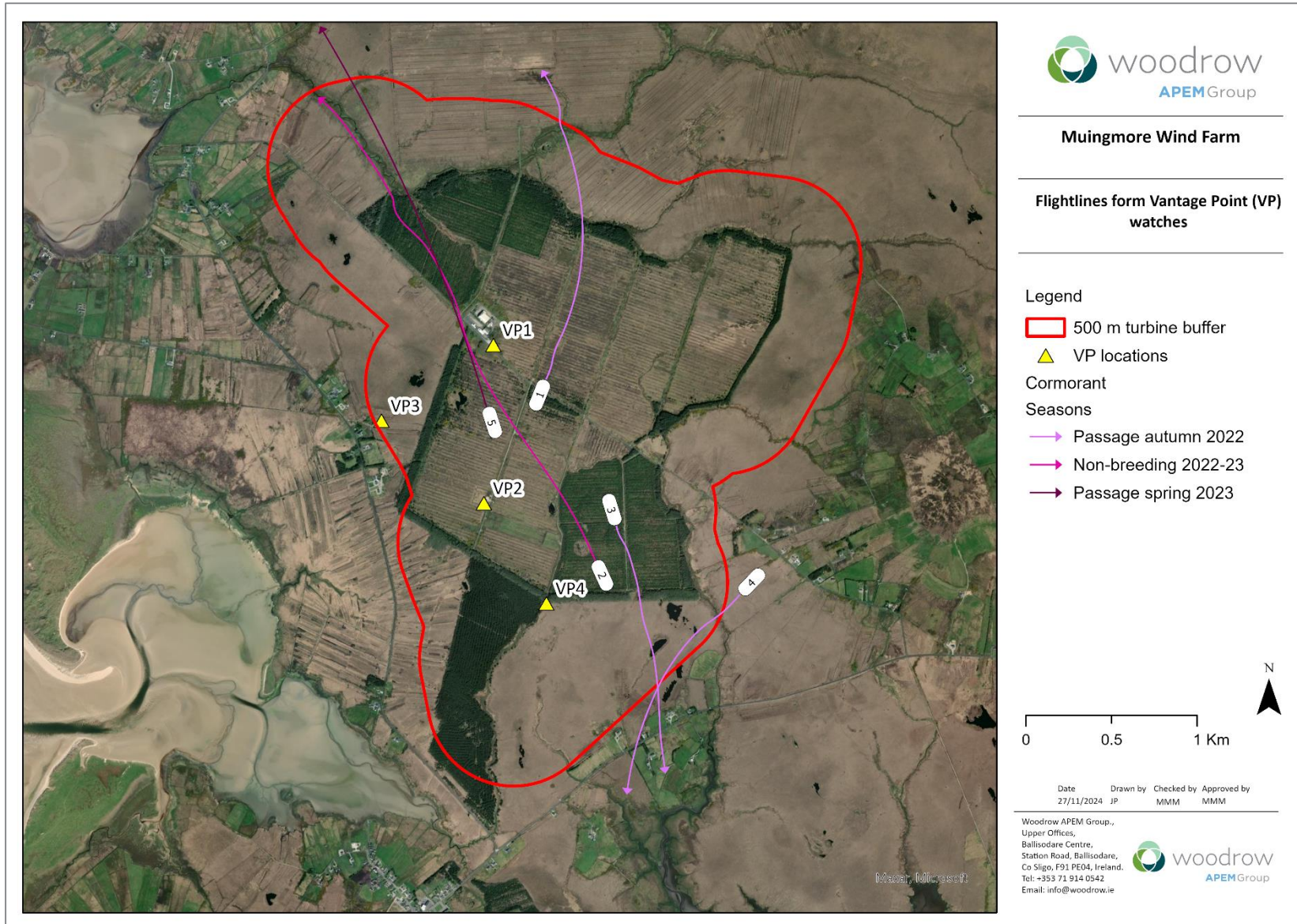


Figure IX.7: Cormorant flightlines from VP watches

Table IX.8: VP watch data for grey heron

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	21/06/2021	13:17	Grey heron	1	10	B	25			Feeding
2	1	21/06/2021	13:31	Grey heron	1	5	A	80			
3	1	28/06/2021	19:26	Grey heron	1	0	A	8			Flying
4	2	21/07/2021	10:39	Grey heron	1	15	B	60			Landed at small pond
5	2	21/07/2021	10:58	Grey heron	1	15	B	58			
6	4	10/06/2021	15:33	Grey heron	1	20	B	5			
7	4	18/08/2021	14:55	Grey heron	1	5	A	31			
8	2	21/02/2022	11:52	Grey heron	1	20	B	34			Commuting
9	2	21/02/2022	12:41	Grey heron	1	5	A	47			
10	2	21/02/2022	12:41	Grey heron	1	20	B	28			Flying
11	2	21/02/2022	13:15	Grey heron	3	15	B	108			Flying
12	3	14/10/2021	13:34	Grey heron	1	25	B	52			Commuting
13	3	25/11/2021	10:33	Grey heron	1	20	B	22			Commuting
14	1	14/04/2022	12:20	Grey heron	1	250	C	180			
15	1	03/08/2022	12:32	Grey heron	1	30	B	120			
16	2	18/08/2022	13:01	Grey heron	1	2	A	3			
17	2	18/08/2022	13:25	Grey heron	1	5	A	5			
18	3	19/07/2022	10:30	Grey heron	1	30	B	5			
19	4	05/05/2022	16:35	Grey heron	1	30	B	60			
20	4	27/07/2022	18:09	Grey heron	1	5	A	2			
21	1	11/11/2022	13:31	Grey heron	1	20	B	40			
22	2	22/02/2023	13:39	Grey heron	1	5	A	120			
23	2	13/09/2022	14:03	Grey heron	1	120	C	120			
24	2	02/03/2023	15:02	Grey heron	1	25	B	115			
25	3	05/03/2023	07:45	Grey heron	1	8	A	20			
26	3	05/03/2023	07:45	Grey heron	1	15	B	75			
27	3	05/03/2023	08:35	Grey heron	1	3	A	45			

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
28	3	05/03/2023	08:35	Grey heron	1	2	A	60			Commuting
29	4	08/03/2023	14:55	Grey heron	1	30	B	25			
30	4	06/03/2023	18:43	Grey heron	1	25	B	45			
31	4	03/08/2023	14:10	Grey heron	1	20	B	5			
32	2	03/11/2023	08:03	Grey heron	1	20	B	15			Commuting
33	1	16/4/2024	07:32	Grey heron	1	15	B	78		Ad	Flying
34	1	22/4/2024	16:09	Grey heron	1	30	B	67		Ad	Flying
35	4	24/4/2024	16:18	Grey heron	1	30	B	32		Ad	Flying
36	4	20/5/2024	15:58	Grey heron	1	30	B	46		Ad	Flying

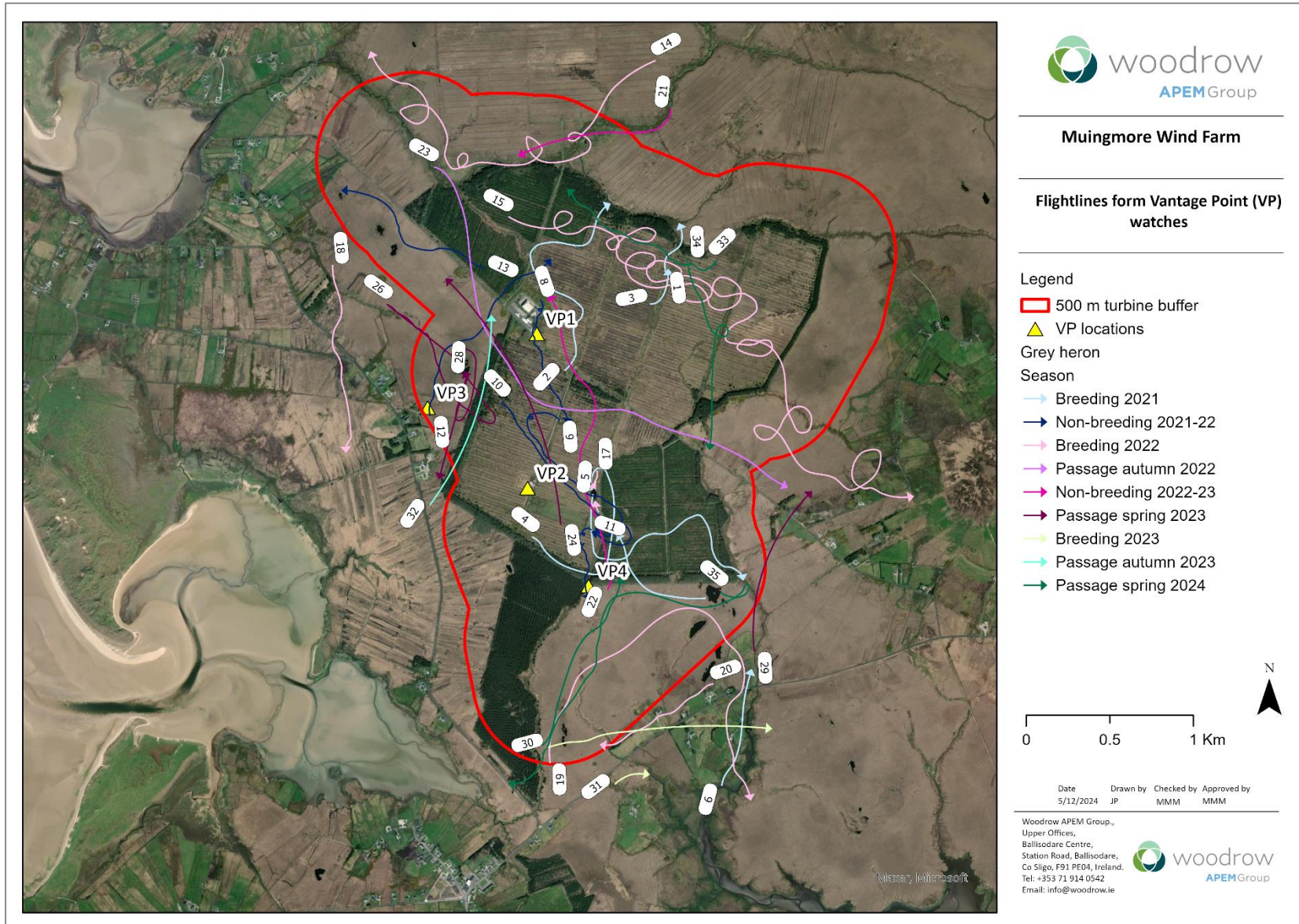


Figure IX.8: Grey heron flightlines from VP watches

Table IX.9: VP watch data for snipe

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	13/10/2021	10:04	Snipe	1	5	A	5			Commuting
2	2	13/10/2021	11:27	Snipe	1	10	B	5			Commuting
3	2	28/02/2022	08:25	Snipe	1	15	B	12			
4	2	28/02/2022	09:38	Snipe	1	15	B	16			Flying
5	3	14/10/2021	11:45	Snipe	1	10	B	12			
6	1	13/10/2022	08:55	Snipe	5	45	B	425			
7	2	11/11/2022	17:11	Snipe	2	45	B	90			
8	2	30/01/2023	13:05	Snipe	1	60	B	125			
9	3	10/10/2022	14:45	Snipe	27	25	B	540			
10	3	19/10/2022	09:54	Snipe	11	20	B	440			
11	4	20/10/2022	18:58	Snipe	2	40	B	110			
12	4	19/02/2023	16:54	Snipe	1	80	B	40			Flushed by kestrel
13	2	11/10/2022	09:23	Snipe	1	30	B	70			Landed
14	2	10/06/2023	17:28	Snipe	1	35	B	30			Displaying
15	3	25/07/2023	13:17	Snipe	2	60	B	16			
16	4	05/05/2023	11:27	Snipe	1	40	B	20			Drumming
17	4	05/05/2023	13:50	Snipe	2	50	B	90			Drumming
18	4	25/07/2023	11:00	Snipe	1	30	B	12			
19	4	26/07/2023	10:28	Snipe	1	70	B	23			
20	4	26/07/2023	11:10	Snipe	1	40	B	9			
21	1	14/10/2023	17:37	Snipe	2	60	B	60			
22	2	03/11/2023	09:15	Snipe	1	10	B	8			Flying

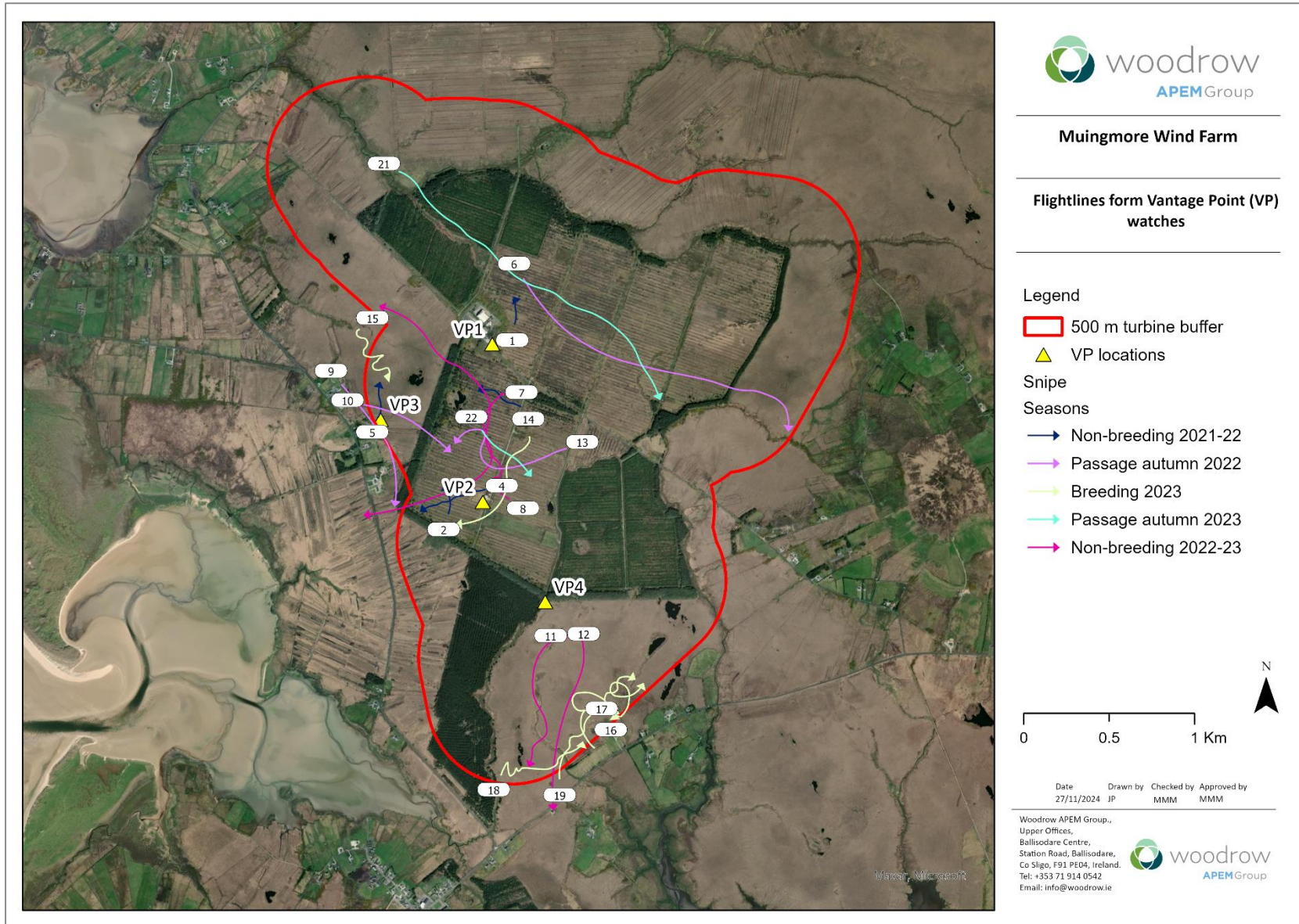


Figure IX.9: Snipe flightlines from VP watches

Table IX.10: VP watch data for other waders

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	24/11/2021	09:23	Lapwing	3	100	B	222			Commuting
2	1	19/01/2022	12:12	Woodcock	1	40	B	17			Flying
3	1	19/01/2022	12:12	Woodcock	1	30	B	4			
4	3	16/12/2021	13:41	Woodcock	1	1	A	9			Commuting
5	4	12/01/2022	08:15	Woodcock	1	1	A	5			
6	2	19/10/2022	15:58	Wilson's phalarope	18	80	B	1,080			
7	4	16/10/2022	10:19	Curlew	2	40	B	5			Dropped out of view
8	4	17/11/2022	08:14	Greenshank	1	50	B	20			Dropped out of view
9	4	25/07/2023	11:40	Golden plover	3	40	B	36			
10	2	07/05/2023	17:12	Whimbrel	7	150	C	945			

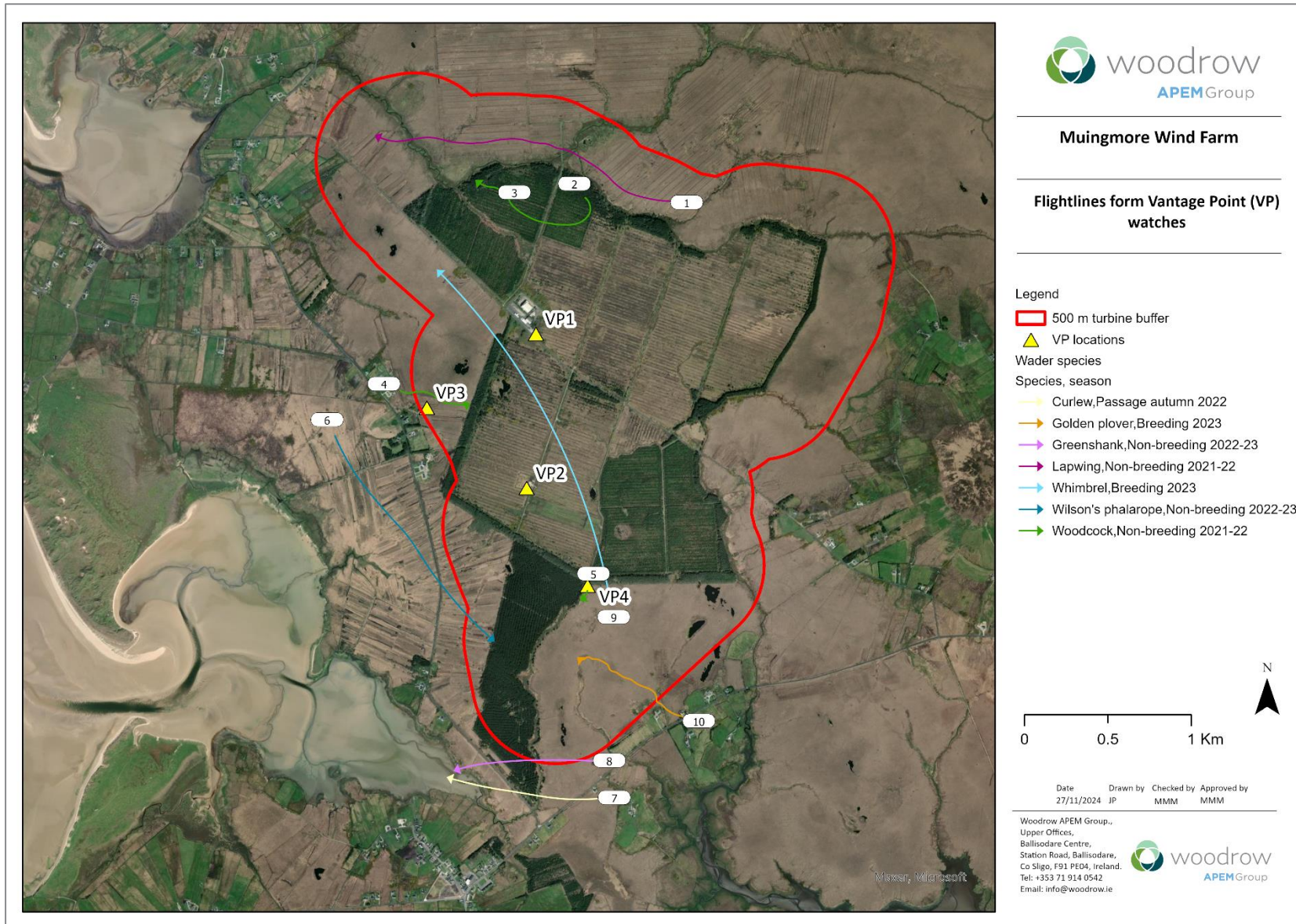


Figure IX.10: Waders flightlines from VP watches

Table IX.11: VP watch data for mallard

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	3	28/4/2021	11:17	Mallard	1	30	B	24	M		Flying
2	3	10/5/2021	15:12	Mallard	1	5	A	28	M		Flying
3	3	10/5/2021	16:33	Mallard	1	15	B	22	M		Flying
4	3	25/8/2021	14:58	Mallard	1	5	A	16	F		Flying
5	1	3/8/2022	11:46	Mallard	1	15	B	45		Ad	Commuting
6	3	27/4/2022	16:43	Mallard	2	15	B	50	M	Ad	Commuting
7	3	27/4/2022	17:05	Mallard	1	10	B	38	M	Ad	Commuting
8	3	17/5/2022	11:21	Mallard	1	15	B	5			Commuting
9	4	21/4/2022	17:25	Mallard	1	15	B	65	M	Ad	Commuting
10	4	5/5/2022	16:53	Mallard	1	10	B	40	F	Ad	Commuting
11	4	15/5/2022	20:32	Mallard	1	15	B	20	M	Ad	Commuting
12	4	15/5/2022	20:49	Mallard	1	45	B	20	M	Ad	Commuting
13	3	19/2/2023	12:32	Mallard	3	7	A	45	2M 1F		Displaying
14	4	12/11/2022	7:33	Mallard	4	25	B	40			Commuting
15	3	4/4/2023	18:10	Mallard	1	5	A	10	M	Ad	Present
16	4	5/4/2023	18:22	Mallard	4	35	B	400		Ad	Present
17	3	1/8/2023	13:05	Mallard	2	20	B	30			Commuting
18	3	1/8/2023	14:30	Mallard	1	15	B	10	F	Ad	Commuting
19	4	25/1/2024	10:39	Mallard	2	15	B	60			Flushed
20	2	17/4/2024	7:18	Mallard	4	10	B	40	M+F	Ad	Flying
21	2	17/4/2024	7:39	Mallard	4	25	B	112	M+F	Ad	Flying
22	3	18/4/2024	7:35	Mallard	2	5	A	8	M	Ad	Hunting
23	4	24/4/2024	12:08	Mallard	1	20	B	9	M	Ad	Flying
24	3	15/5/2024	19:38	Mallard	1	40	B	29	M	Ad	Flying
25	2	16/5/2024	19:43	Mallard	2	30	B	16	M	Ad	Flying

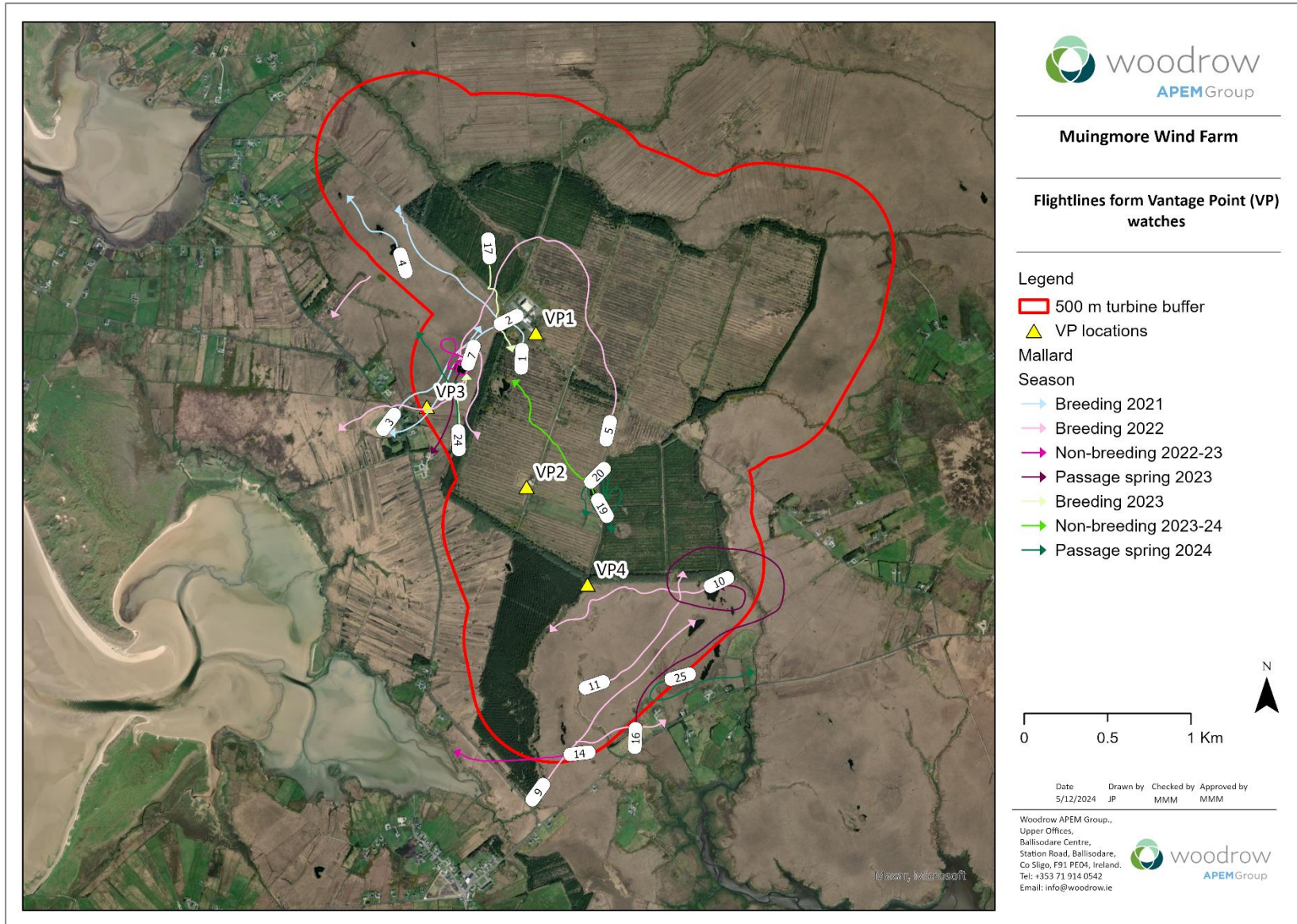


Figure IX.11: Mallard flightlines from VP watches

Table IX.12: VP watch data for teal

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	2	1/7/2021	13:24	Teal	1	10	B	12			Nesting
2	4	26/7/2023	11:30	Teal	5	80	B	75			
3	3	3/3/2023	17:19	Teal	2	2	A	40			Landed on pond

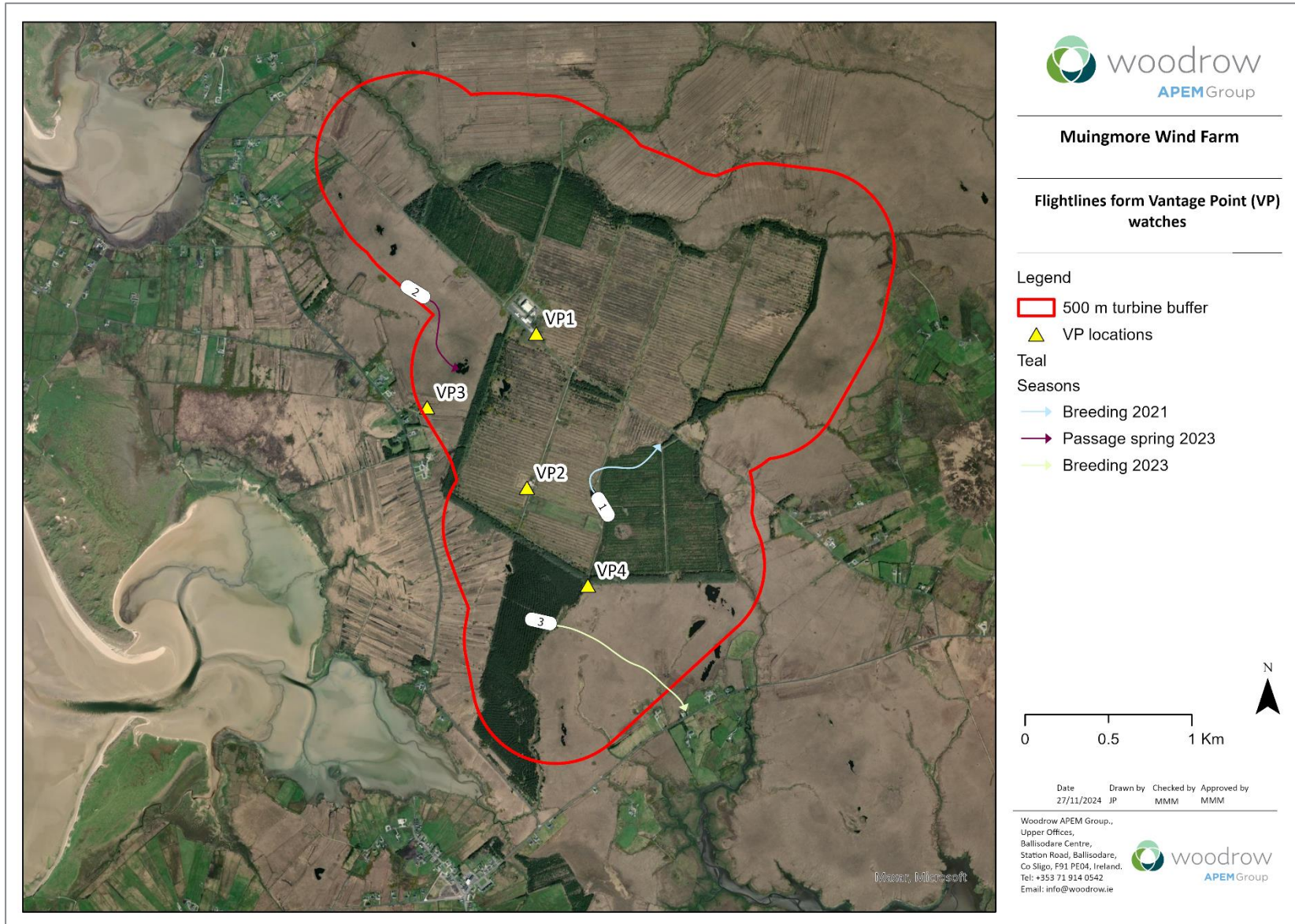


Figure IX.12: Teal flightlines from VP watches

Table IX.13: VP watch data for greylag goose, Canada goose and whooper swan

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	3	03/03/2023	17:40	Greylag goose	17	80	B	4,335			
2	3	07/06/2023	17:13	Canada goose	1	25	B	50			
3	3	17/12/2021	09:32	Whooper swan	3	25	B	120			Commuting
4	1	25/01/2023	11:39	Whooper swan	5	30	B	875		Ad, Juv	

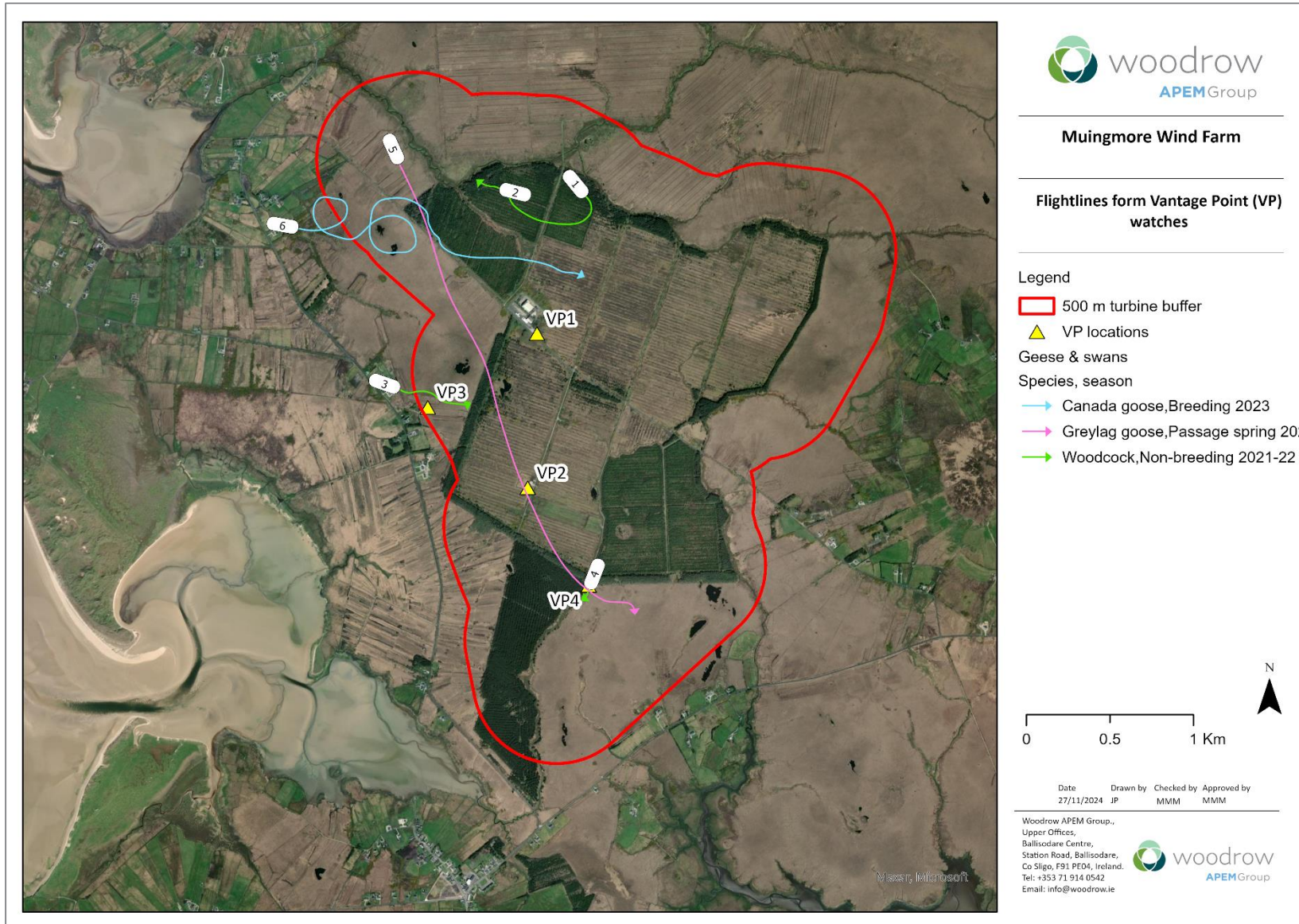


Figure IX.13: Greylag goose, Canada goose and whooper swan flightlines from VP watches

Table IX.14: VP watch data for kittiwake

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	2	10/04/2023	17:48	Kittiwake	1	15	B	40			Presume storm blown bird in, reorienting. Unusual record

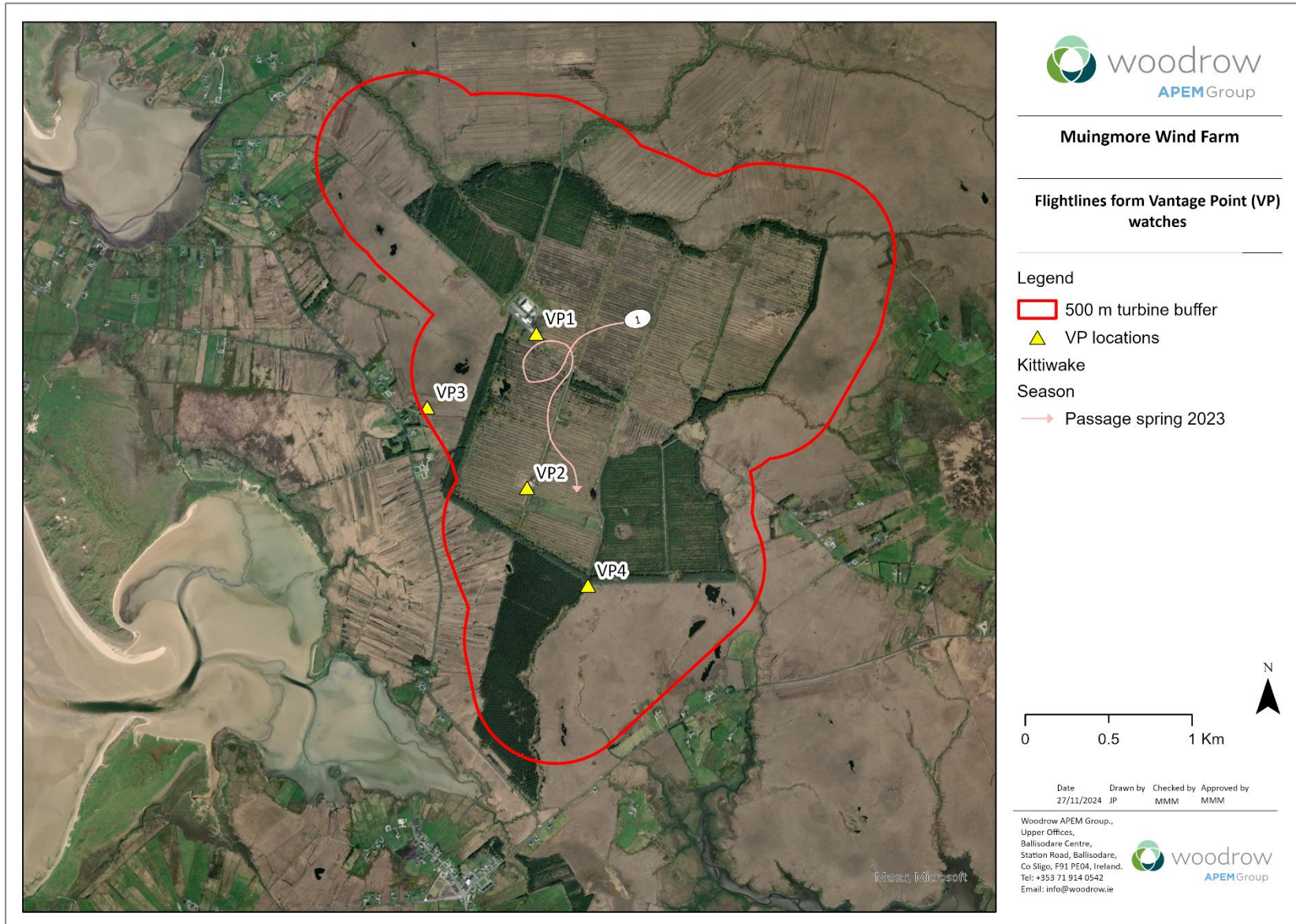


Figure IX.14: Kittiwake flightlines from VP watches

Table IX.15: VP watch data for buzzard

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	28/04/2021	15:48	Buzzard	1	100	B	53			
2	1	14/04/2022	12:10	Buzzard	1	-	-	-			Perched
3	1	09/08/2022	16:48	Buzzard	2	55	B	440			Pair circling up high
4	2	21/04/2022	11:50	Buzzard	1	35	B	68			
5	2	21/04/2022	12:50	Buzzard	1	40	B	120			Hunting
6	2	21/04/2022	12:52	Buzzard	1	150	C	310			
7	4	29/08/2022	11:41	Buzzard	2	50	B	5			
8	1	08/02/2023	16:05	Buzzard	1	15	B	20			Landed on bog
9	2	08/02/2023	12:21	Buzzard	1	25	B	40			

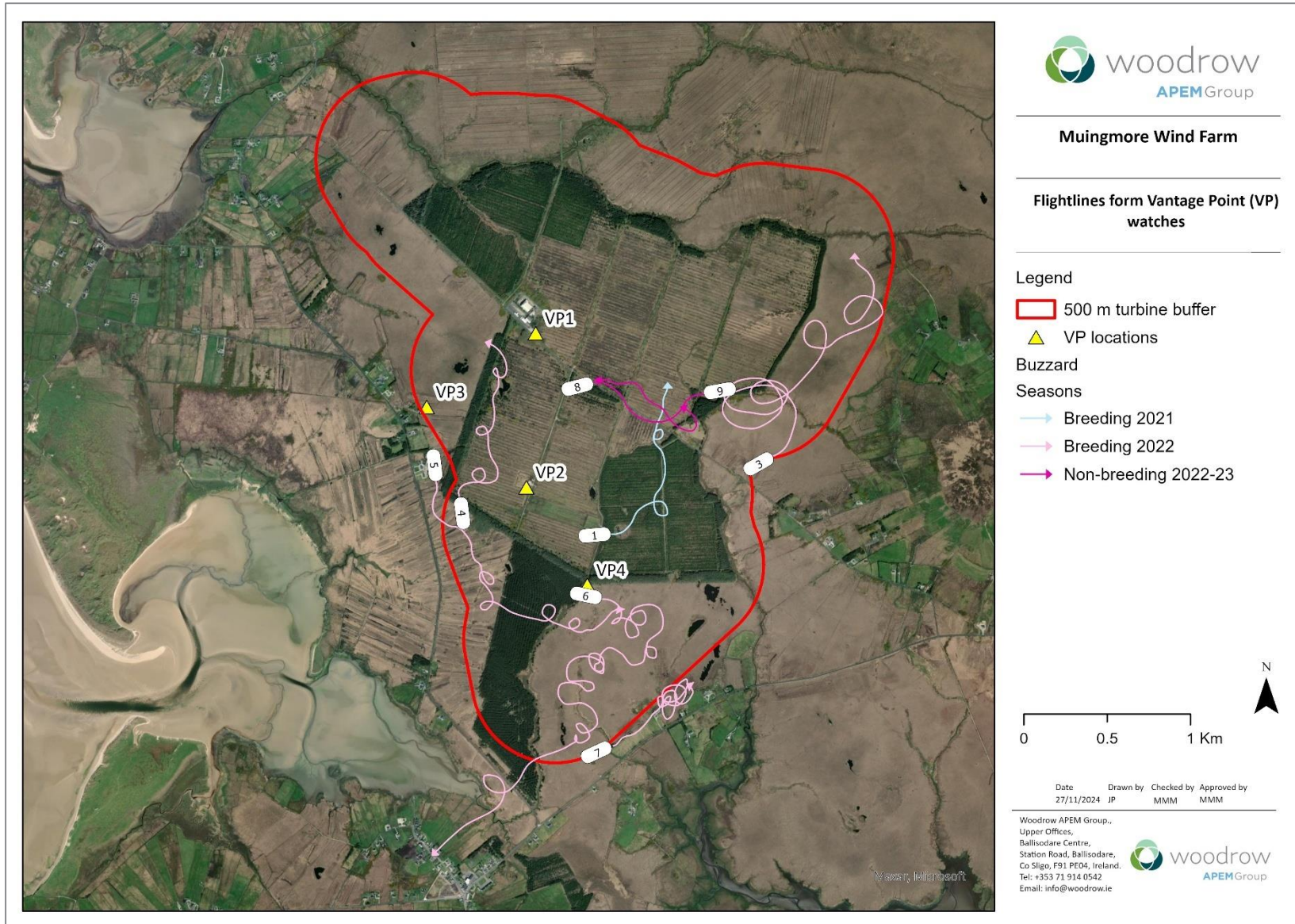


Figure IX.15: Buzzard flightlines from VP watches

Table IX.16: VP watch data for sparrowhawk

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	4	18/8/2021	13:29	Sparrowhawk	1	5	A	14	F		Flying
2	1	4/10/2021	11:05	Sparrowhawk	1	30	B	9	M		Perched
3	2	28/9/2021	9:18	Sparrowhawk	2	15	B	646	F	Juv	Hunting
4	2	28/9/2021	9:25	Sparrowhawk	2	0	A	374	F	Juv	Hunting
5	2	28/9/2021	9:32	Sparrowhawk	2	35	B	196	F	Juv	Calling
6	2	28/9/2021	9:43	Sparrowhawk	2	20	B	100	F	Juv	Hunting
7	2	28/9/2021	9:46	Sparrowhawk	2	20	B	36	F	Juv	Hunting
8	2	28/9/2021	10:28	Sparrowhawk	2	10	B	78	F	Juv	Hunting
9	2	28/9/2021	9:21	Sparrowhawk	1	10	B	34	M		Hunting
10	2	28/9/2021	9:35	Sparrowhawk	1	10	B	34	M		Hunting
11	2	5/10/2021	9:21	Sparrowhawk	1	20	B	24	M		Hunting
12	2	5/10/2021	10:21	Sparrowhawk	1	20	B	123	M		Flying
13	3	9/9/2021	12:45	Sparrowhawk	1	0	A	19	M		Perched
14	3	9/9/2021	13:22	Sparrowhawk	1	20	B	48	F		Flying
15	1	13/10/2021	7:45	Sparrowhawk	1	20	B	21	F	Ad	Commuting
16	1	13/10/2021	8:44	Sparrowhawk	1	25	B	12			Commuting
17	1	13/10/2021	9:52	Sparrowhawk	1	10	B	5	F	Ad	Hunting
18	1	20/10/2021	9:57	Sparrowhawk	1	15	B	216	F	Ad	Commuting
19	1	20/10/2021	10:26	Sparrowhawk	1	20	B	36	F	Ad	Hunting
20	1	9/12/2021	9:48	Sparrowhawk	1	20	B	31	F	Ad	Commuting
21	1	9/12/2021	9:49	Sparrowhawk	1	15	B	0	F	Ad	Perched
22	1	9/12/2021	9:51	Sparrowhawk	1	15	B	10	F	Ad	Commuting
23	1	18/1/2022	10:22	Sparrowhawk	1	25	B	171	F	Ad	Commuting
24	1	18/1/2022	10:38	Sparrowhawk	1	20	B	41	F	Ad	Commuting
25	1	19/1/2022	12:12	Sparrowhawk	1	30	B	15		Ad	Hunting
26	1	19/1/2022	12:13	Sparrowhawk	1	30	B	4		Ad	Hunting
27	1	27/1/2022	9:38	Sparrowhawk	1	20	B	17	F	Ad	Displaying

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	1	27/1/2022	9:39	Sparrowhawk	1	15	B	8	M	Ad	Commuting
29	1	27/1/2022	9:44	Sparrowhawk	1	25	B	31	F	Ad	Displaying
30	1	27/1/2022	9:45	Sparrowhawk	2	20	B	36	M + F	Ad	Displaying
31	1	27/1/2022	9:52	Sparrowhawk	2	20	B	44	F	Ad	Displaying
32	1	9/2/2022	10:44	Sparrowhawk	1	25	B	42	F	Ad	Displaying
33	2	22/11/2021	12:48	Sparrowhawk	1	5	A	15	F	Ad	Hunting
34	2	22/11/2021	12:57	Sparrowhawk	1	10	B	131	M	Juv	Hunting
35	2	21/2/2022	12:34	Sparrowhawk	1	20	B	37	F	Ad	Commuting
36	3	17/2/2022	10:32	Sparrowhawk	1	10	B	16	F	Ad	Hunting
37	3	9/3/2022	9:37	Sparrowhawk	1	10	B	39	F	Ad	Hunting
38	4	15/5/2022	20:42	Sparrowhawk	1	20	B	30		Ad	Commuting
39	1	19/10/2022	12:01	Sparrowhawk	2	35	B	870	M	Juv	Interacting
40	1	19/10/2022	12:34	Sparrowhawk	2	20	B	440	M	Juv	Mobbed
41	1	11/11/2022	12:09	Sparrowhawk	1	3	A	45	F		Hunting
42	2	15/11/2022	8:11	Sparrowhawk	1	2	A	35	F		Hunting
43	2	12/12/2022	11:41	Sparrowhawk	1	60	B	150	F		Circling
44	2	12/12/2022	14:37	Sparrowhawk	2	5	A	6	M		Flying
45	3	17/11/2022	10:29	Sparrowhawk	1	2	A	5	M	Juv	Perched
46	4	16/10/2022	10:33	Sparrowhawk	1	45	B	85	F		Soaring
47	4	20/10/2022	17:11	Sparrowhawk	1	30	B	80	F		Present
48	4	11/12/2022	14:54	Sparrowhawk	1	1	A	5	F	Ad	Present
49	4	11/12/2022	14:56	Sparrowhawk	1	1	A	4	F	Ad	Present
50	4	11/12/2022	15:04	Sparrowhawk	1	1	A	10	F	Ad	Present
51	4	21/1/2023	10:14	Sparrowhawk	1	25	B	35			Commuting
52	2	13/9/2022	14:07	Sparrowhawk	2	20	B	90	M + F		Present
53	2	14/10/2022	17:29	Sparrowhawk	1	3	A	35	F		Hunting
54	1	2/3/2023	11:14	Sparrowhawk	1	80	B	415	F		Displaying
55	1	2/3/2023	11:16	Sparrowhawk	1	60	B	265	M		Displaying

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
56	1	2/3/2023	12:48	Sparrowhawk	1	75	B	95	F		Displaying
57	1	6/3/2023	72:4	Sparrowhawk	1	2	A	35	M	Ad	Hunting
58	2	2/3/2023	9:34	Sparrowhawk	1	2	A	50	F		Hunting
59	4	8/3/2023	14:48	Sparrowhawk	1	45	B	350			Displaying
60	1	6/5/2023	11:37	Sparrowhawk	1	2	A	30	M		Present
61	2	8/3/2023	17:06	Sparrowhawk	1	25	B	55	F		Hunting
62	2	8/3/2023	17:50	Sparrowhawk	1	10	B	35	F		Hunting
63	2	10/6/2023	17:03	Sparrowhawk	1	2	A	5	M		Hunting
64	2	10/6/2023	17:05	Sparrowhawk	1	2	A	10	M		Present
65	2	25/7/2023	16:15	Sparrowhawk	1	40	B	10			Flying
66	2	25/7/2023	17:45	Sparrowhawk	1	50	B	22			Flying
67	3	25/7/2023	13:10	Sparrowhawk	1	70	B	35		Ad	Flying
68	3	25/7/2023	14:27	Sparrowhawk	1	70	B	10		Ad	Flying
69	3	26/7/2023	14:35	Sparrowhawk	1	70	B	11		Ad	Flying
70	3	26/7/2023	15:30	Sparrowhawk	1	100	B	10		Ad	Flying
71	4	5/5/2023	16:16	Sparrowhawk	1	3	A	15			Present
72	4	26/7/2023	11:40	Sparrowhawk	1	60	B	12			Flying
73	2	31/10/2023	10:03	Sparrowhawk	1	3	A	15	M	Ad	Present
74	2	15/12/2024	10:53	Sparrowhawk	1	2	A	5	M	Ad	Hunting
75	2	15/12/2024	10:54	Sparrowhawk	1	2	A	5	M	Ad	Hunting
76	1	16/4/2024	9:53	Sparrowhawk	1	2	A	29	F	Ad	Hunting
77	3	23/4/2024	17:28	Sparrowhawk	1	30	B	19	M	Ad	Provisioning
78	4	24/4/2024	10:07	Sparrowhawk	1	100	B	137	M	Ad	Hunting
79	4	24/4/2024	17:57	Sparrowhawk	1	20	B	13	M	Ad	Hunting
80	2	25/4/2024	7:11	Sparrowhawk	1	10	B	23	M	Ad	Hunting

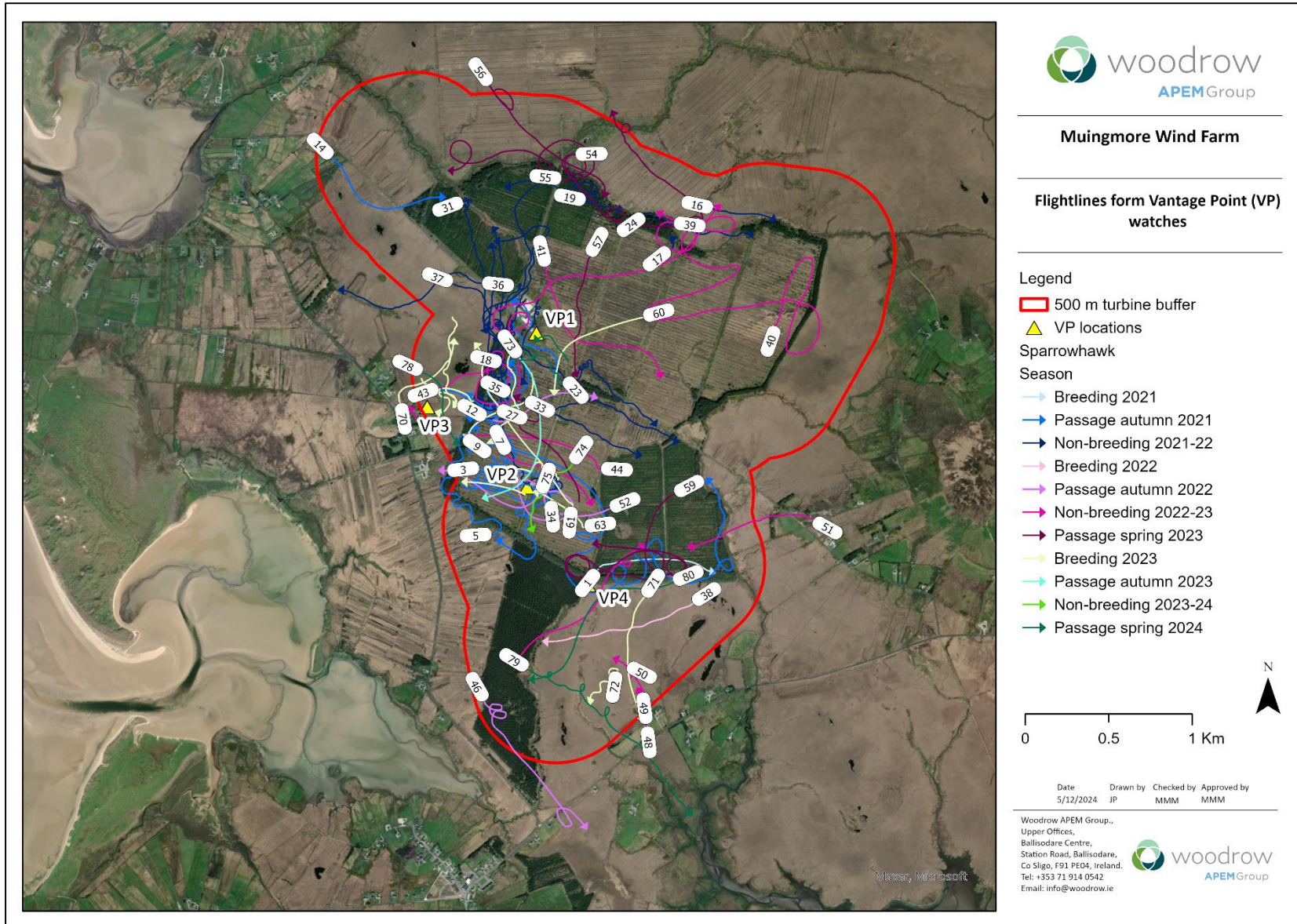


Figure IX.16: Sparrowhawk flightlines from VP watches

Table IX.17: VP watch data for kestrel during Year 1

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	28/04/2021	15:29	Kestrel	1	50	B	19			Flying
2	1	08/06/2021	15:04	Kestrel	1	20	B	38			Dove for prey
3	1	08/06/2021	17:10	Kestrel	2	15	B	46			
4	1	10/06/2021	10:41	Kestrel	1	15	B	6			Flying
5	1	10/06/2021	13:09	Kestrel	1	20	B	27			Returning to factory
6	1	17/06/2021	13:22	Kestrel	1	10	B	5			Calling and flying
7	1	17/06/2021	13:30	Kestrel	1	20	B	101			Flying in SE direction
8	1	17/06/2021	13:36	Kestrel	1	30	B	38			
9	1	17/06/2021	13:45	Kestrel	1	15	B	67			
10	1	17/06/2021	14:00	Kestrel	1	20	B	180			
11	1	21/06/2021	14:23	Kestrel	1	20	B	118			Landed between scrub out of sight
12	1	13/07/2021	10:46	Kestrel	1	20	B	27		Juv	
13	1	13/07/2021	10:49	Kestrel	1	30	B	88			
14	1	13/07/2021	10:49	Kestrel	1	10	B	41			Flushed
15	1	15/07/2021	15:05	Kestrel	1	30	B	17			Heard rook alarm call
16	2	27/04/2021	11:31	Kestrel	1	20	B	86			Flying low scanning for prey
17	2	27/04/2021	12:19	Kestrel	1	30	B	32			Hovering
18	2	27/04/2021	13:39	Kestrel	1	20	B	26			Low over young forestry plantation
19	2	09/06/2021	16:25	Kestrel	1	30	B	169	M	Ad	Flying from the nest in old factory
20	2	09/06/2021	16:25	Kestrel	1	30	B	38	F	Ad	Returning to nest at old factory
21	2	24/08/2021	12:02	Kestrel	1	35	B	317			
22	3	28/04/2021	09:46	Kestrel	1	35	B	5			Dropped slowly to ground
23	3	28/04/2021	10:00	Kestrel	1	50	B	10			Dove to ground for prey
24	3	28/04/2021	10:04	Kestrel	1	40	B	73			Hunting
25	3	28/04/2021	10:54	Kestrel	1	25	B	12			Appeared over the treeline
26	3	28/04/2021	11:06	Kestrel	1	60	B	560			
27	3	28/04/2021	11:06	Kestrel	1	60	B	89			

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
28	3	28/04/2021	11:30	Kestrel	1	40	B	18			
29	3	28/04/2021	11:38	Kestrel	1	50	B	87			
30	3	28/04/2021	12:12	Kestrel	1	25	B	225			
31	3	10/05/2021	14:30	Kestrel	1	2	A	21			
32	3	10/05/2021	14:45	Kestrel	1	20	B	10			Flying
33	3	10/05/2021	15:43	Kestrel	1	20	B	12			Altered flight direction around the observer
34	3	21/06/2021	10:54	Kestrel	1	20	B	47			
35	3	28/06/2021	14:21	Kestrel	1	0	A	12			
36	3	25/08/2021	12:51	Kestrel	1	40	B	197			Flew into the line of conifer trees
37	3	25/08/2021	12:52	Kestrel	1	30	B	39			Perched at the edge of young conifer forestry
38	3	25/08/2021	13:24	Kestrel	1	35	B	74			Gradually gained altitude
39	4	08/06/2021	11:59	Kestrel	1	35	B	13			
40	4	10/08/2021	13:50	Kestrel	1	20	B	70			
41	4	10/08/2021	13:53	Kestrel	1	25	B	137			Foraging
42	4	10/08/2021	13:51	Kestrel	1	5	A	37			
43	4	10/08/2021	13:54	Kestrel	1	25	B	94			Alarm called then flew east out of sight
44	4	10/08/2021	15:24	Kestrel	1	5	A	360			
45	4	18/08/2021	12:26	Kestrel	1	20	B	12			Flying back to field, circled then landed
46	4	24/08/2021	17:11	Kestrel	1	25	B	20			Came from small lake
47	4	26/08/2021	16:07	Kestrel	1	40	B	55			
48	4	26/08/2021	16:34	Kestrel	1	15	B	9			Flying from perch on conifer branch
49	1	20/10/2021	07:52	Kestrel	1	15	B	12			Flying north-west
50	1	24/11/2021	10:39	Kestrel	1	-	-	-			Perched upon dead tree. Viewed until end of count
51	1	27/01/2022	10:31	Kestrel	1	15	B	42			Calling out and moving east
52	1	27/01/2022	10:32	Kestrel	1	30	B	29			Circling and flying
53	1	27/01/2022	10:32	Kestrel	1	30	B	11			
54	1	27/01/2022	10:33	Kestrel	1	-	-	-			Perched at 5m until VP count finished

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
55	1	17/02/2022	15:17	Kestrel	1	10	B	7			Flying west
56	1	17/02/2022	15:17	Kestrel	1	-	-	-			Perched at 5m until end of count.
57	1	10/03/2022	09:53	Kestrel	1	15	B	137			Commuting west
58	1	10/03/2022	10:39	Kestrel	1	15	B	92			
59	3	14/10/2021	12:21	Kestrel	1	15	B	7	M	Juv	Flying
60	3	22/11/2021	09:28	Kestrel	1	25	B	42			Commuting and hunting
61	3	29/11/2021	09:32	Kestrel	1	20	B	22	M		Commuting
62	3	09/03/2022	08:49	Kestrel	1	20	B	22			Commuting
63	4	25/10/2021	13:09	Kestrel	1	50	B	47			Circling

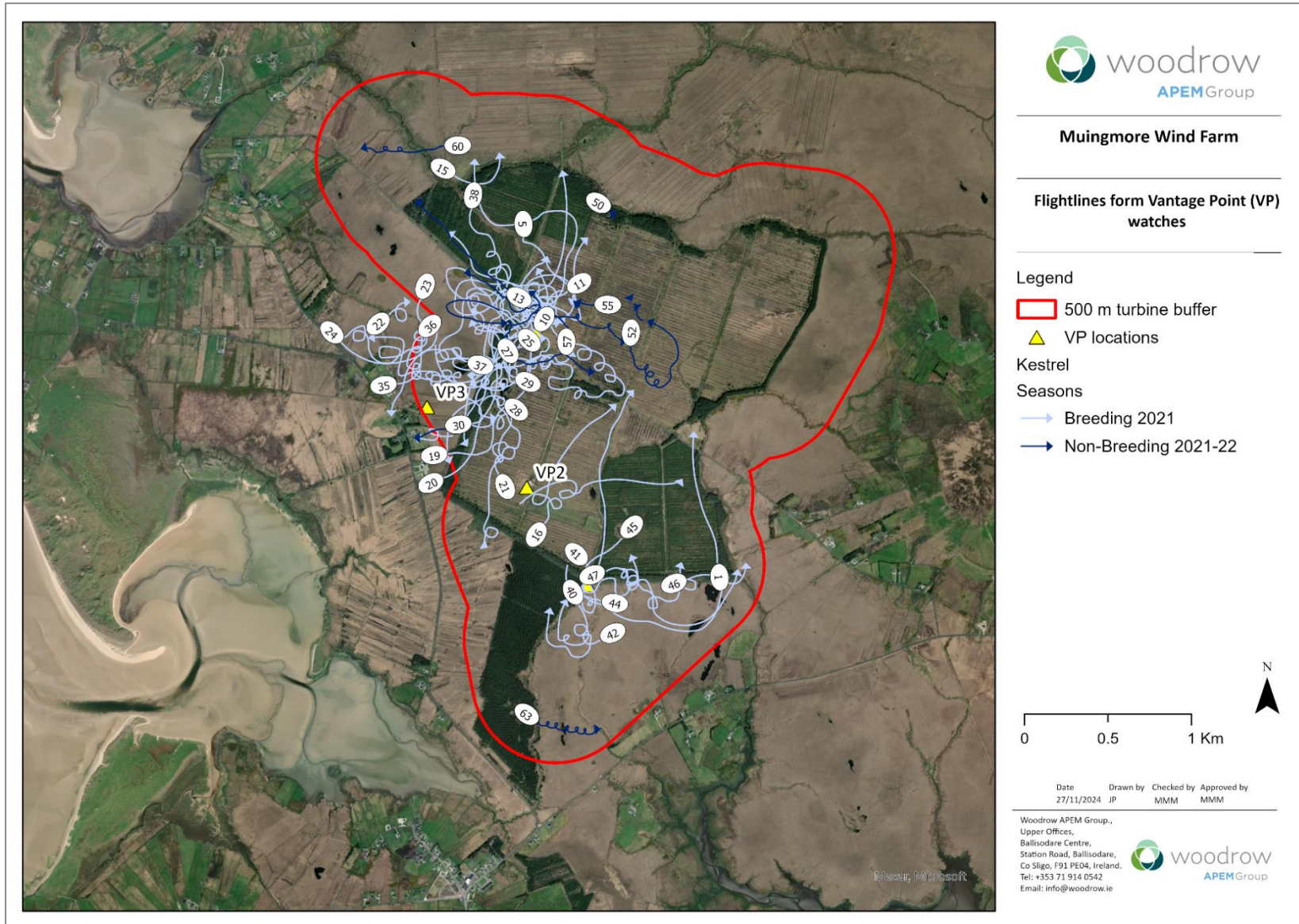


Figure IX.17: Kestrel flightlines from VP watches (Year 1)

Table IX.18: VP watch data for kestrel during Year 2

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	27/4/2022	10:35	Kestrel	1	10	B	5		A	Commuting
2	1	4/5/2022	16:28	Kestrel	1	10	B	15	M	A	Hunting
3	1	4/5/2022	16:35	Kestrel	1	10	B	10	M	A	Hunting
4	1	4/5/2022	17:20	Kestrel	1	40	B	120	M	A	Hunting
5	1	4/5/2022	17:25	Kestrel	1	20	B	20	M	A	Commuting
6	1	4/5/2022	18:10	Kestrel	1	15	B	10		A	Commuting
7	1	4/5/2022	18:20	Kestrel	2	30	B	480	M + F	A	Hunting
8	1	25/6/2022	10:40	Kestrel	1	10	B	20	F	A	Flying
9	1	25/6/2022	10:55	Kestrel	2	20	B	70	M + F	A	Hunting
10	1	25/6/2022	11:05	Kestrel	1	20	B	20	F	A	Hunting
11	1	25/6/2022	11:38	Kestrel	1	10	B	15	F	A	Flying
12	1	25/6/2022	14:20	Kestrel	1	10	B	40	F	A	Flying
13	1	25/6/2022	15:40	Kestrel	1	20	B	58	F	A	Hunting
14	1	6/7/2022	10:54	Kestrel	1	25	B	40	F	A	Flying
15	1	6/7/2022	11:48	Kestrel	4	20	B	120	M + F	2A 2J	Feeding
16	2	21/4/2022	12:30	Kestrel	1	25	B	180		A	Hunting
17	2	21/4/2022	13:35	Kestrel	1	30	B	300		A	Hunting
18	2	28/4/2022	15:16	Kestrel	2	150	C	760	M + F	A	Courtship
19	2	28/4/2022	15:55	Kestrel	2	120	C	600	M + F	A	Courtship
20	2	28/4/2022	16:14	Kestrel	2	100	B	280	M + F	A	Courtship
21	2	28/4/2022	16:25	Kestrel	2	180	C	700	M + F	A	Courtship
22	2	28/4/2022	16:59	Kestrel	2	100	B	10	M + F	A	Courtship
23	2	28/4/2022	17:10	Kestrel	2	100	B	700	M + F	A	Courtship
24	2	3/8/2022	15:22	Kestrel	2	20	B	720			Hunting
25	2	18/8/2022	11:39	Kestrel	1	20	B	140			Hunting
26	2	18/8/2022	16:22	Kestrel	1	40	B	4			Hunting
27	3	27/4/2022	16:35	Kestrel	1	25	B	65		A	Commuting

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	3	13/6/2022	14:20	Kestrel	2	18	B	20	M + F	A	Mobbing
29	3	19/7/2022	10:40	Kestrel	1	25	B	200	F	A	Mobbing
30	4	26/6/2022	11:50	Kestrel	1	25	B	20		A	Hunting
31	1	11/9/2022	17:05	Kestrel	1	15	B	20	M	A	Calling
32	1	10/10/2022	11:53	Kestrel	2	8	A	330			Interacting
33	1	13/10/2022	7:52	Kestrel	1	10	B	30		J	Commuting
34	1	19/10/2022	13:22	Kestrel	1	15	B	65			Hunting
35	1	25/1/2023	12:26	Kestrel	1	30	B	140	F	A	Hunting
36	1	25/1/2023	12:31	Kestrel	2	75	B	540	M	A	Displaying
37	1	25/1/2023	12:36	Kestrel	1	50	B	40	M	A	Commuting
38	1	25/1/2023	12:36	Kestrel	1	75	B	200	F	A	Hunting
39	1	25/1/2023	12:47	Kestrel	1	2	A	30	M	A	Commuting
40	1	25/1/2023	13:45	Kestrel	1	5	A	25	M	A	Commuting
41	3	14/9/2022	17:03	Kestrel	1	5	A	10	M	A	Hunting
42	3	14/9/2022	17:05	Kestrel	1	5	A	5	M	A	Flying
43	3	10/10/2022	15:22	Kestrel	1	20	B	35			Commuting
44	3	19/10/2022	9:18	Kestrel	1	20	B	115			Hunting
45	4	21/1/2023	8:27	Kestrel	1	15	B	25			Commuting
46	1	5/3/2023	13:55	Kestrel	1	10	B	65	M	Ad	Flying
47	1	6/3/2023	7:17	Kestrel	1	10	B	20	M	Ad	Mobbing
48	1	6/3/2023	7:31	Kestrel	1	10	B	40	F		Mobbing
49	1	6/4/2023	12:58	Kestrel	2	20	B	60	M+F		Mobbing
50	1	6/4/2023	14:34	Kestrel	2	15	B	50	M+F		Mobbing
51	1	6/4/2023	14:53	Kestrel	2	20	B	60	M+F		Circling
52	1	7/4/2023	12:56	Kestrel	1	15	B	10	F		Present
53	2	2/3/2023	7:21	Kestrel	1	25	B	65			Flying
54	2	2/3/2023	7:21	Kestrel	2	20	B	90	M+F	Ad	Mobbing

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
55	2	10/4/2023	15:31	Kestrel	1	20	B	25			Present
56	3	3/3/2023	17:53	Kestrel	1	10	B	10	F		Flying
57	3	5/3/2023	15:29	Kestrel	1	20	B	265	F		Hunting
58	1	25/6/2022	11:00	Kestrel	1	-	-	-		J	Perched
59	1	6/7/2022	10:56	Kestrel	1	15	B	-		J	Flying

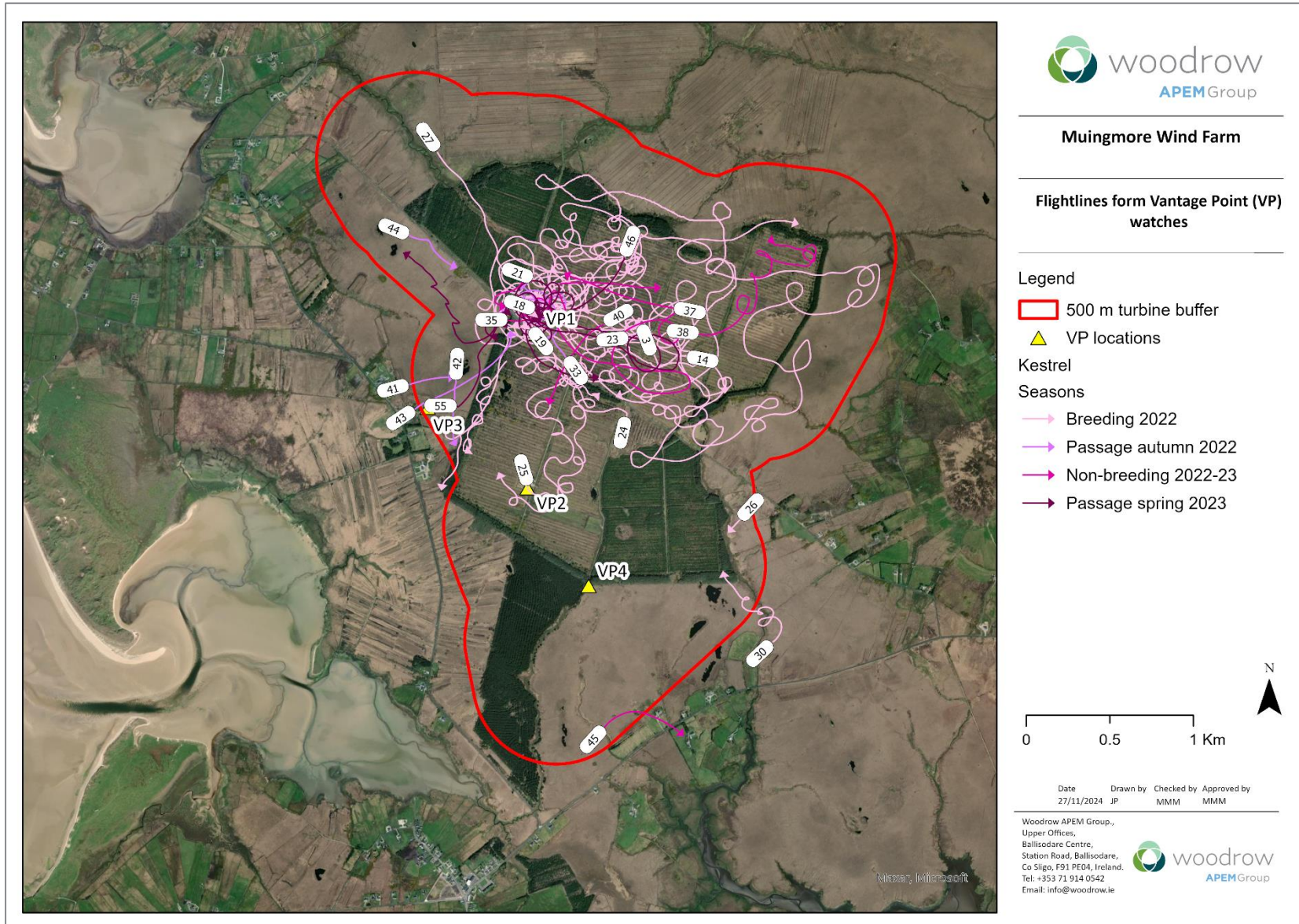


Figure IX.18: Kestrel flightlines from VP watches (Year 2)

Table IX.19: VP watch data for kestrel during Year 3

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	1/3/2023	17:13	Kestrel	2	10	B	390	M+F	Ad	Displaying
2	1	1/3/2023	18:03	Kestrel	1	20	B	40	M	Ad	Flying
3	1	1/3/2023	18:30	Kestrel	1	20	B	25	F	Ad	Flying
4	1	9/3/2023	8:08	Kestrel	1	20	B	135	M	Ad	Displaying
5	1	9/3/2023	8:12	Kestrel	2	15	B	200	M+F		Displaying
6	1	9/3/2023	8:14	Kestrel	2	50	B	80	M+F		Flying
7	1	9/3/2023	8:48	Kestrel	1	15	B	85	M		Hunting
8	1	6/5/2023	9:51	Kestrel	1	20	B	20	F		Present
9	1	6/5/2023	12:30	Kestrel	1	100	B	150	F		Present
10	1	6/5/2023	12:30	Kestrel	1	100	B	150	F		Present
11	1	9/6/2023	12:15	Kestrel	1	40	B	120	F	Ad	Present
12	1	9/6/2023	12:17	Kestrel	1	90	B	70	F	Ad	Present
13	1	9/6/2023	13:02	Kestrel	1	10	B	8	M	Ad	Present
14	1	9/6/2023	13:19	Kestrel	1	50	B	180	M	Ad	Flying
15	1	9/6/2023	13:19	Kestrel	1	50	B	180	M	Ad	Flying
16	1	9/6/2023	16:20	Kestrel	1	12	B	150	M	Ad	Flying
17	1	9/6/2023	16:23	Kestrel	1	30	B	40	M	Ad	Flying
18	1	9/6/2023	16:25	Kestrel	1	10	B	20		Ad	Hunting
19	1	9/6/2023	18:51	Kestrel	1	30	B	40		Ad	Present
20	1	9/6/2023	19:22	Kestrel	1	20	B	75		Ad	Present
21	1	5/7/2023	11:45	Kestrel	1	-	-	-	F		Perched
22	1	5/7/2023	12:35	Kestrel	1	50	B	37	M		Flying
23	1	5/7/2023	13:33	Kestrel	1	100	B	24			Flying
24	1	5/7/2023	13:54	Kestrel	1	-	-	-			Perched
25	1	6/7/2023	10:37	Kestrel	2	80	B	360			Flying
26	1	6/7/2023	11:52	Kestrel	1	90	B	75			Flying
27	1	1/8/2023	8:35	Kestrel	1	5	A	0		Juv	Perched

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
28	1	2/8/2023	10:11	Kestrel	1	35	B	240	F	Ad	Hunting
29	2	5/3/2023	10:28	Kestrel	1	45	B	170	M	Ad	Soaring
30	2	8/3/2023	16:34	Kestrel	1	20	B	75	F	Ad	Flying
31	2	8/3/2023	16:49	Kestrel	1	15	B	65	F	Ad	Flying
32	2	8/3/2023	16:50	Kestrel	1	15	B	30	M	Ad	Displaying
33	2	10/6/2023	13:40	Kestrel	1	20	B	10	F	Ad	Present
34	2	10/6/2023	13:54	Kestrel	1	40	B	90	F	Ad	Present
35	3	1/8/2023	14:20	Kestrel	1	15	B	20	M	Juv	Fly-land
36	3	1/8/2023	14:40	Kestrel	1	15	B	5	M	Juv	Fly-land
37	3	1/8/2023	14:48	Kestrel	1	20	B	10	M	Juv	Fly-land
38	4	3/8/2023	13:58	Kestrel	1	20	B	40		Juv	Hunting
39	4	9/8/2023	19:36	Kestrel	1	10	B	65	F	Ad	Hunting
40	1	7/9/2023	9:20	Kestrel	1	15	B	40	M	Ad	Present
41	1	7/9/2023	10:11	Kestrel	1	8	A	5	M	Ad	Present
42	1	7/9/2023	10:17	Kestrel	1	12	B	25	M	Ad	Present
43	1	7/9/2023	13:46	Kestrel	1	10	B	5	M	Ad	Present
44	3	6/9/2023	8:46	Kestrel	1	35	B	35		Juv	Present
45	1	19/2/2024	10:14	Kestrel	1	60	B	65	M	Ad	Hunting
46	1	5/3/2024	10:53	Kestrel	1	15	B	20	M	Ad	Hunting
47	1	5/3/2024	11:04	Kestrel	2	15	B	60	M+F	Ad	Hunting
48	3	13/12/2023	14:18	Kestrel	1	15	B	15	M	Ad	Fly-land
49	3	13/12/2023	14:21	Kestrel	1	10	B	20	M	Ad	Fly-land
50	4	30/11/2023	13:35	Kestrel	1	20	B	160			Circling
51	1	20/3/2024	10:36	Kestrel	1	15	B	10	M	Ad	Present
52	1	20/3/2024	11:42	Kestrel	2	15	B	30	M+F	Ad	Mobbing
53	1	20/3/2024	11:58	Kestrel	1	20	B	45	F	Ad	Present
54	1	16/4/2024	8:31	Kestrel	1	50	B	39	F	Ad	Flying
55	1	16/4/2024	8:40	Kestrel	1	40	B	78	M	Ad	Hunting

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
56	1	16/4/2024	8:47	Kestrel	1	20	B	34	F	Ad	Flying
57	1	16/4/2024	10:08	Kestrel	1	50	B	177	M	Ad	Courtship
58	1	16/4/2024	10:08	Kestrel	1	30	B	175	F	Ad	Courtship
59	1	16/4/2024	10:46	Kestrel	1	5	A	29	M	Ad	Flying
60	1	16/4/2024	10:48	Kestrel	1	30	B	6	M	Ad	Flying
61	1	16/4/2024	10:53	Kestrel	1	15	B	4	F	Ad	Flying
62	3	18/4/2024	10:39	Kestrel	1	25	B	59	M	Ad	Hunting
63	3	23/4/2024	15:59	Kestrel	1	10	B	21	F	Ad	Flying
64	3	23/4/2024	16:00	Kestrel	1	10	B	8	F	Ad	Flying
65	3	23/4/2024	16:03	Kestrel	1	10	B	7	M	Ad	Flying
66	3	23/4/2024	16:05	Kestrel	1	20	B	33	M	Ad	Flying
67	3	23/4/2024	16:11	Kestrel	1	10	B	18	F	Ad	Hunting
68	3	23/4/2024	16:13	Kestrel	1	25	B	13	M	Ad	Flying
69	3	23/4/2024	16:18	Kestrel	1	30	B	106	F	Ad	Hunting

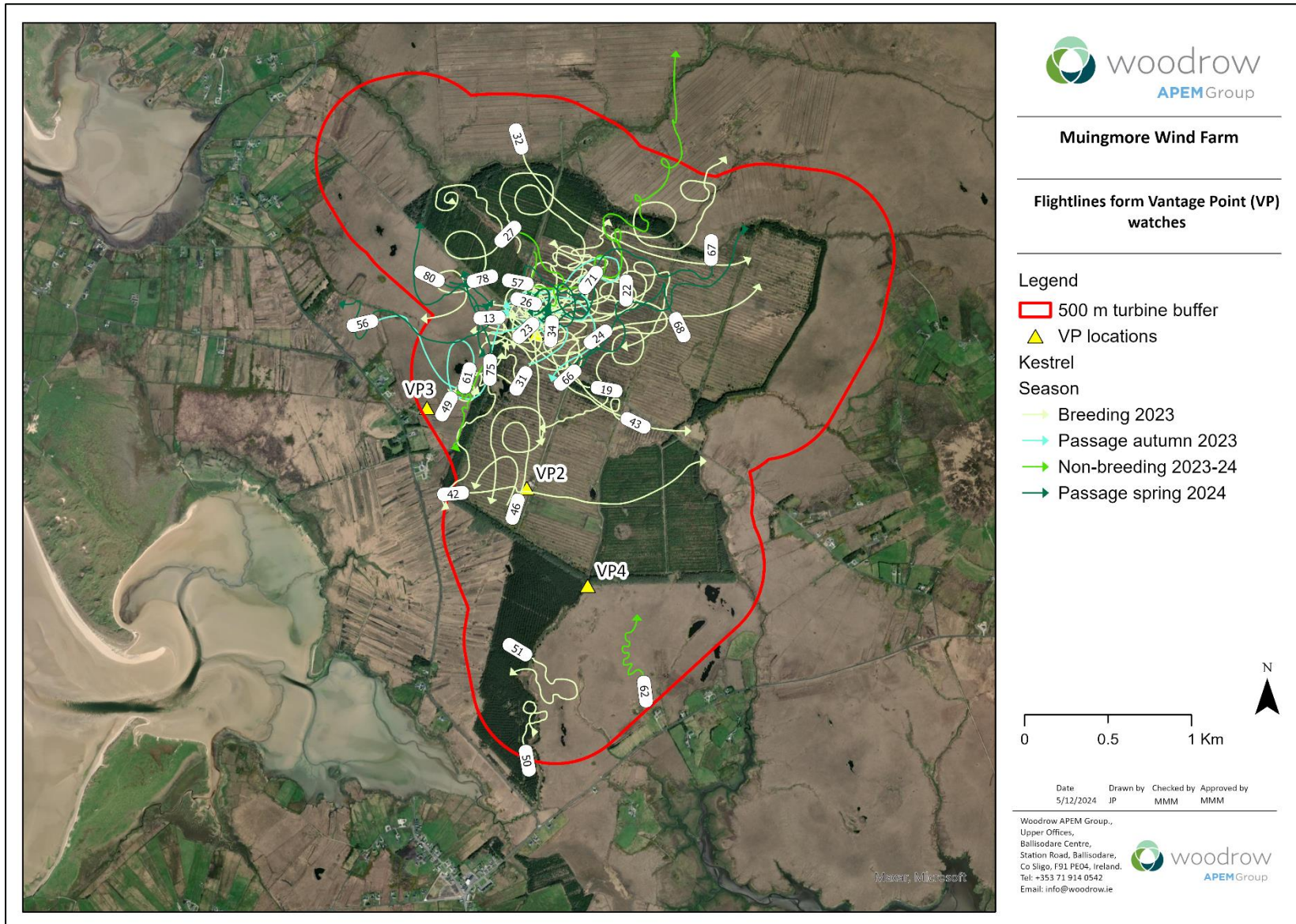


Figure IX.19: Kestrel flightlines from VP watches (Year 3)

Table IX.20: VP watch data for hen harrier

Flight ID	VP No.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	1	09/08/2022	11:25	Hen harrier	1	35	B	210			Flew towards factory, swallows chased it off
2	3	11/08/2022	10:20	Hen harrier	1	70	B	15			Flying west
3	2	22/02/2023	13:27	Hen harrier	1	8	A	150			Hunting over grassland from VP
4	2	22/02/2023	16:12	Hen harrier	1	8	A	300	M	Juv	Present
5	4	20/02/2023	13:22	Hen harrier	1	15	B	40	RG		Hunting
6	4	20/02/2023	13:22	Hen harrier	1	15	B	40	RG		Hunting
7	4	03/03/2023	14:22	Hen harrier	1	3	A	160			Present
8	2	31/10/2023	11:21	Hen harrier	1	2	A	40	F	Ad	Hunting
9	4	20/12/2023	13:30	Hen harrier	1	5	A	20	RG		Present

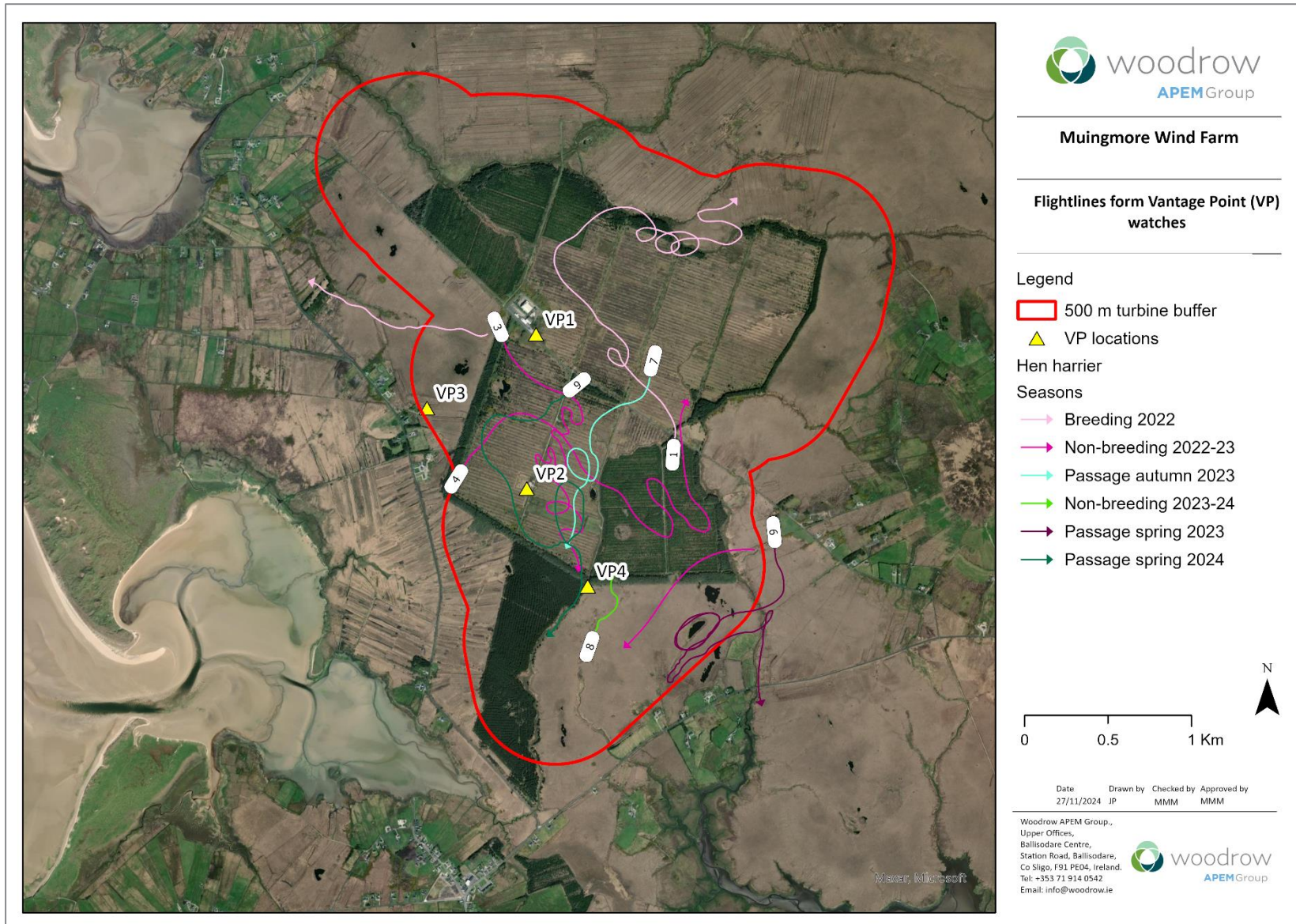


Figure IX.20: Hen harrier flightlines from VP watches

Table IX.21: VP watch data for Merlin

Flight ID	VP no.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total	Sex	Age	Behaviour
1	1	9/2/2022	9:33	Merlin	1	40	B	26	F	Ad	Commuting
2	3	15/11/2022	16:46	Merlin	1	8	A	30	M	Ad	Present
3	4	5/4/2023	12:37	Merlin	1	5	A	8	F		Hunting
4	4	5/4/2023	14:35	Merlin	1	2	A	15	M		Present
5	4	30/11/2023	10:20	Merlin	1	5	A	35	M	Ad	Flying

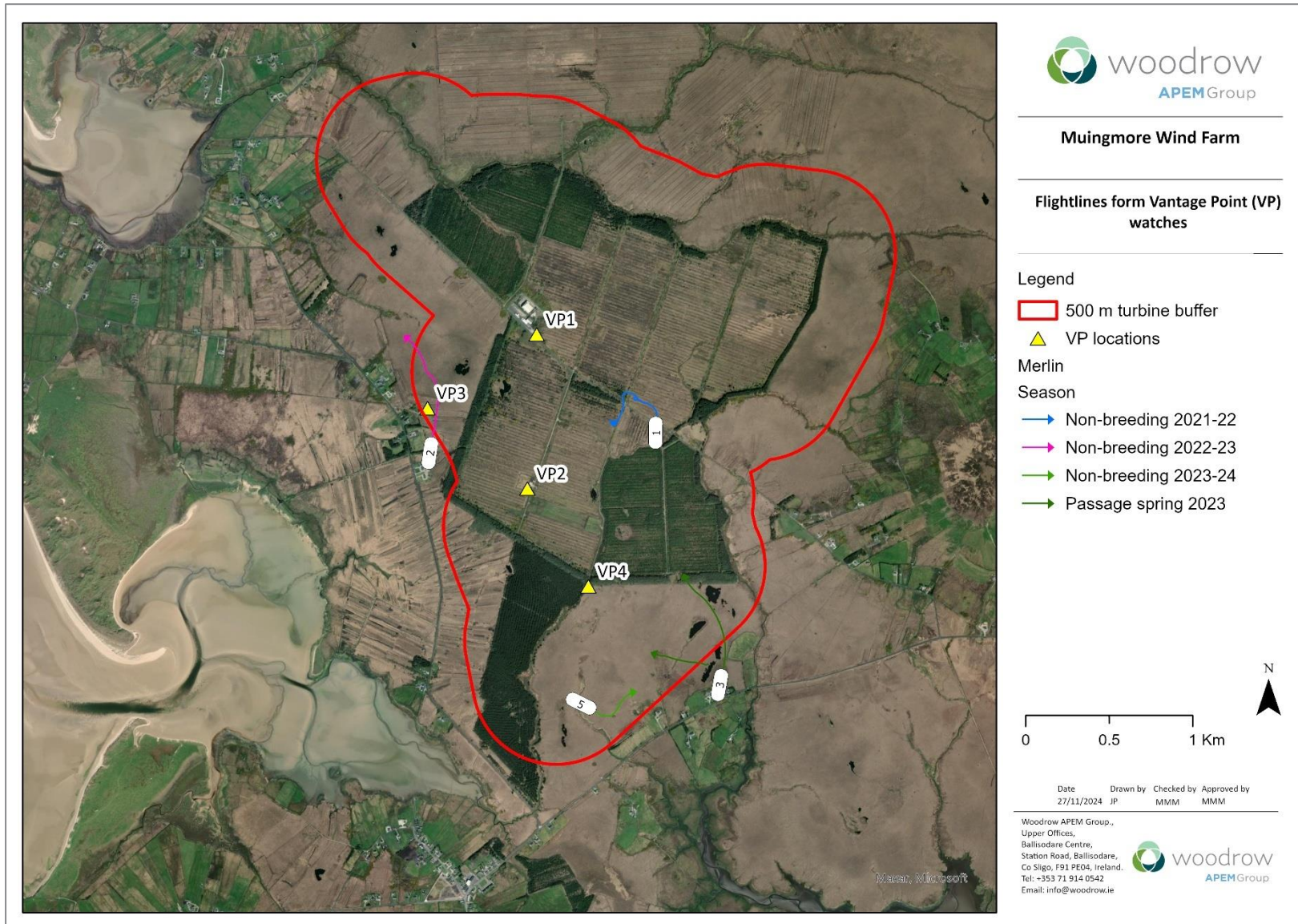


Figure IX.21: Merlin flightlines from VP watches

Table IX.22: VP watch data for hobby

Flight ID	VP No.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
1	3	19/7/2022	10:40	Hobby	1	25	B	240			Mobbing
2	3	19/7/2022	10:57	Hobby	1	5	A	30			Fly-land
3	3	19/7/2022	12:09	Hobby	1	1	A	20			Fly-land

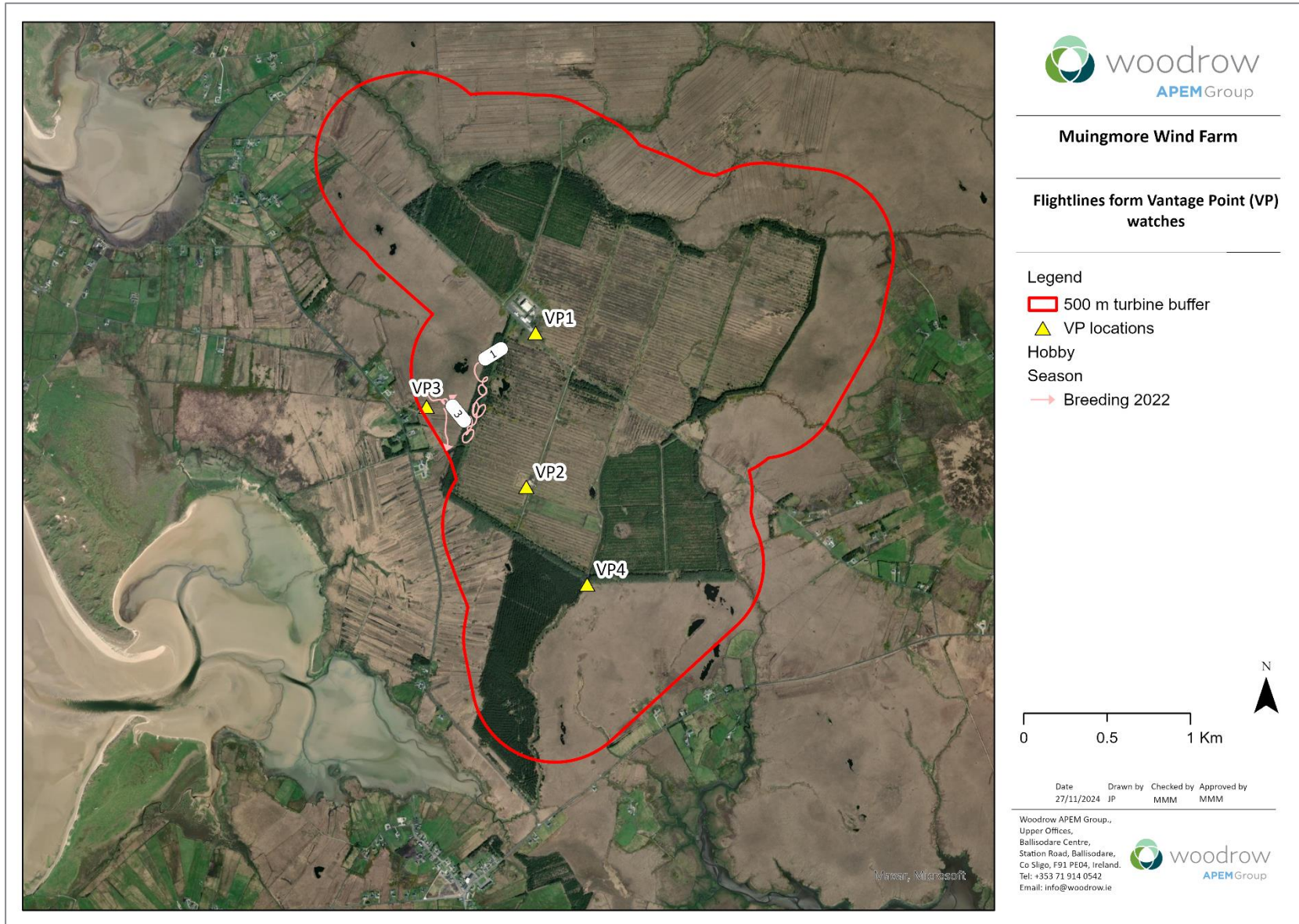


Figure IX.22: Hobby flightlines from VP watches

Table IX.23: VP watch data for peregrine

Flight ID	VP No.	Date	Time	Species	No. birds	Height (m)	Height band	Flight total (secs)	Sex	Age	Behaviour
6	3	21/1/2023	12:13	Peregrine	1	40	B	5			Hunting
7	3	21/1/2023	12:13	Peregrine	1	35	B	10			Hunting
12	4	14/11/2022	15:27	Peregrine	1	65	B	80			Circling
13	4	21/1/2023	14:46	Peregrine	1	40	B	55			Commuting
14	4	21/1/2023	14:46	Peregrine	1	40	B	55			Flying
8	3	14/9/2022	17:29	Peregrine	1	30	B	180			Flying
9	3	13/10/2022	15:17	Peregrine	1	60	B	50			Flying
10	4	13/9/2022	15:30	Peregrine	1	15	B	5			Flying
11	4	13/9/2022	15:45	Peregrine	1	25	B	15			Hunting

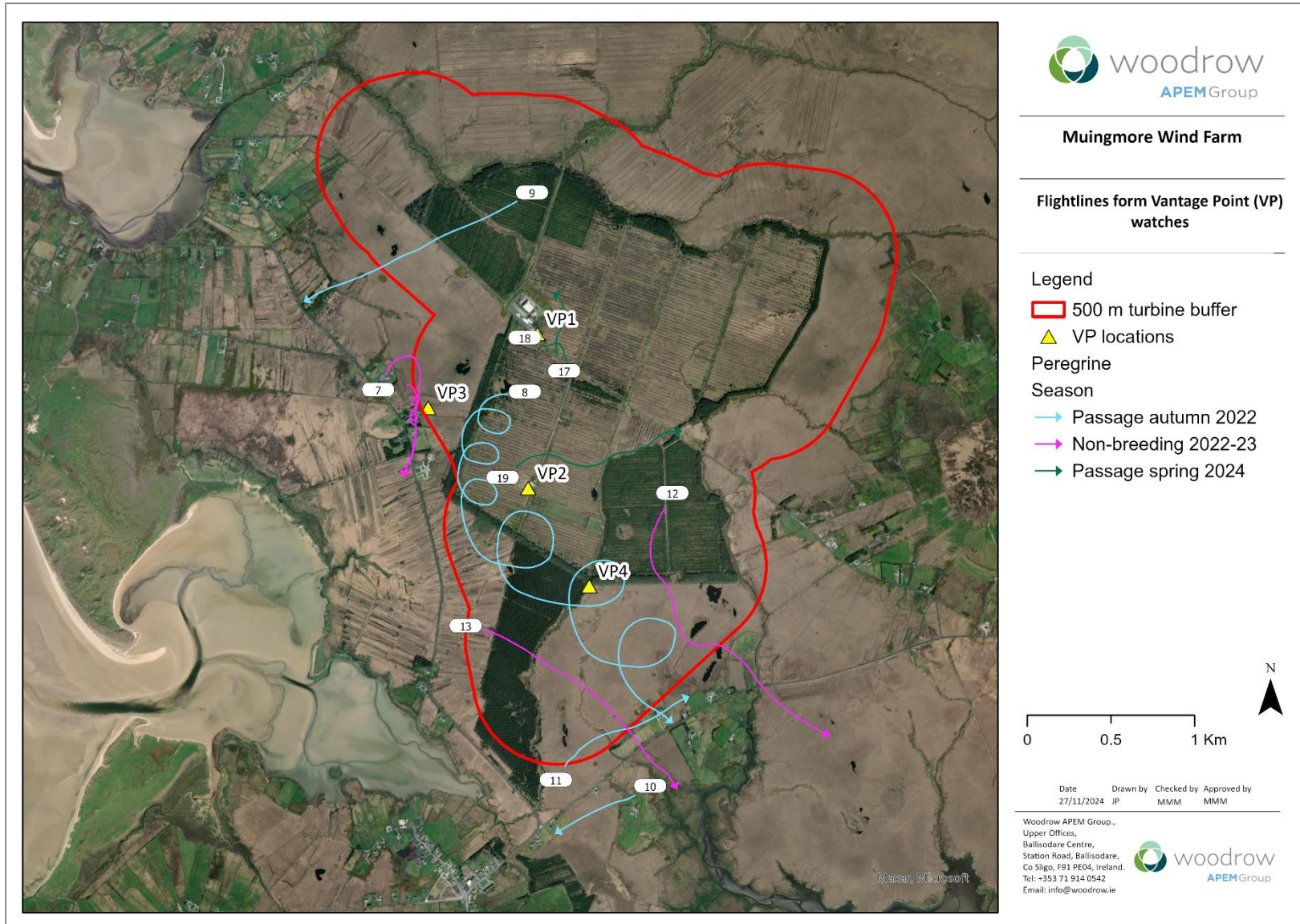


Figure IX.23: Peregrine flightlines from VP watches

Appendix X - Breeding bird survey results

Table X.1: Summary of all breeding bird survey results carried out during the 2021 breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Kestrel	K	2	1	-	Red
Meadow pipit	MP	-	-	30	Red
Snipe	SN	2	1	-	Red
Black-headed gull	BH	-		4	Amber
Goldcrest	GC	-	4	2	Amber
Lesser black-backed gull	LB	1	5	-	Amber
Mallard	MA	5	-	-	Amber
Skylark	S		2	2	Amber
Starling	SG	2		-	Amber
Swallow	SL	2	3	-	Amber
Teal	T	1	2	-	Amber
Willow warbler	WW	2	13	14	Amber
Blackbird	B	5	2	-	Green
Blackcap	BC	-	3	-	Green
Blue tit	BT	2	4	-	Green
Chaffinch	CH	3	13	-	Green
Coal tit	CT	-	6		Green
Cuckoo	CK	6	10	7	Green
Duncock	D	3	2	-	Green
Feral pigeon	FP	6	-	-	Green
Goldfinch	GO	2	-	-	Green
Grey heron	H		1	1	Green
Hooded (grey) crow	HC	1	1	3	Green
Jackdaw	JD	4	-	-	Green
Magpie	MG	-	7	-	Green
Moorhen	MH	-	1	-	Green
Pheasant	PH	2	3	1	Green
Pied wagtail	PW	2	-	-	Green
Raven	RN	8	3	8	Green
Reed bunting	RB	5	-	3	Green
Robin	R	-	9	-	Green
Sedge warbler	SW	7	8	5	Green
Siskin	SK	-	2	-	Green
Sparrowhawk	SH	1	-	-	Green
Stonechat	SC	1	-	2	Green
Whitethroat	WH	-	3	1	Green
Woodpigeon	WP	-	5	-	Green
Wren	WR	2	2	-	Green

Table X.2: Summary of all breeding bird survey results carried out during the 2022 breeding season

Species	BTO code	Visit 1	BoCCI 2020-2026
Kestrel	K.	2	Red
Snipe	SN	1	Red
Meadow pipit	MP	45	Red
Black-headed gull	BH	6	Amber
Herring gull	HG	1	Amber
Lesser black-backed gull	LB	1	Amber
Skylark	S.	4	Amber
Starling	SG	12	Amber
Swallow	SL	12	Amber
Willow warbler	WW	12	Amber
Blackbird	B	7	Green
Blackcap	BC	1	Green
Chaffinch	CH	4	Green
Common redpoll	FR	3	Green
Duncock	D	6	Green
Goldfinch	GO	8	Green
Grey heron	H	1	Green
Magpie	MG	1	Green
Pied wagtail	PW	1	Green
Raven	RN	2	Green
Robin	R.	2	Green
Sedge warbler	SW	2	Green
Siskin	SK	3	Green
Song thrush	ST	2	Green
Sparrowhawk	SH	1	Green
Woodpigeon	WP	1	Green
Wren	WR	4	Green

Table X.3: Summary of all breeding bird survey results carried out during the 2023 breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	BoCCI 2020-2026
Kestrel	K.	-	-	5	-	Red
Meadow pipit	MP	56	26	38	18	Red
Snipe	SN	11	1	-	3	Red
Goldcrest	GC	19	28	28	8	Amber
House sparrow	HS	-	2	-	-	Amber
Linnet	LI	-	-	2	-	Amber
Mallard	MA	5	-	1	-	Amber
Sand martin	SM	-	2	-	-	Amber
Skylark	S.	12	26	24	4	Amber
Starling	SG	6	-	-	-	Amber
Swallow	SL	2	18	7	3	Amber

Species	BTO code	Visit 1	Visit 2	Visit 3	Visit 4	BoCCI 2020-2026
Teal	T.	2	-	1	-	Amber
Willow warbler	WW	25	53	48	4	Amber
Blackbird	B.	9	18	13	2	Green
Blackcap	BC	-	7	14	2	Green
Blue tit	BT	7	2	1	-	Green
Chaffinch	CH	17	11	5	2	Green
Chiffchaff	CC	1	1	1	-	Green
Coal tit	CT	19	10	11	2	Green
Common crossbill	CR	-	-	2	-	Green
Cuckoo	CK	-	5	1	-	Green
Dunnock	D.	5	3	4	-	Green
Goldfinch	GO	1	6	1	-	Green
Grasshopper warbler	GH	-	5	7	-	Green
Great black-backed gull	GB	-	-	1	-	Green
Great tit	GT	2	-	1	-	Green
Grey heron	H.	1	-	2	1	Green
Lesser redpoll	LR	10	1	8	-	Green
Long-tailed tit	LT	-	7	5	-	Green
Mistle thrush	M	2	3	3	-	Green
Moorhen	MH	-	-	1	-	Green
Pied wagtail	PW	1	3	-	-	Green
Reed bunting	RB	4	3	2	-	Green
Robin	R.	27	13	11	1	Green
Sedge warbler	SW	-	4	3	-	Green
Siskin	SK	16	23	14	1	Green
Song thrush	ST	8	3	3	1	Green
Stonechat	SC	-	3	16	1	Green
Treecreeper	TC	-	1	2	-	Green
Woodpigeon	WP	1	-	1	-	Green
Wren	WR	30	14	17	3	Green

Appendix XI - Winter walkover survey results

Table XI.1: Summary of all bird survey results carried out during the 2021-22 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Kestrel	K.	-	1	-	Red
Meadow pipit	MP	13	3	8	Red
Snipe	SN	5	10	4	Red
Woodcock	WK	-	5	1	Red
Goldcrest	GC	2	3	2	Amber
Linnet	LI	5	5	1	Amber
Whooper swan	WS	-	12	-	Amber
Blackbird	B.	32	27	20	Green
Blue tit	BT	5	4	11	Green
Chaffinch	CH	26	13	12	Green
Coal tit	CT	34	15	7	Green
Dunnock	D.	2	1	1	Green
Golden pheasant	GF	4	-	-	Green
Goldfinch	GO	4	4	-	Green
Great black-backed gull	GB	-	2	-	Green
Grey heron	H.	-	-	1	Green
Pheasant	PH	-	1	4	Green
Pied wagtail	PW	2	-	-	Green
Raven	RN		2	-	Green
Robin	R.	24	26	17	Green
Song thrush	ST	1	2	1	Green
Sparrowhawk	SH	1	-	-	Green
Stonechat	SC	13	-	-	Green
Wren	WR	45	41	15	Green

Table XI.2: Summary of all bird survey results carried out during the 2022-23 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Kestrel	K.	1	-	2	Red
Meadow pipit	MP	117	93	28	Red
Redwing	RE	-	3	-	Red
Snipe	SN	12	20	3	Red
Woodcock	WK	-	-	2	Red
Black-headed gull	BH	-	2	-	Amber
Common gull	CM	-	1	-	Amber
Goldcrest	GC	-	-	28	Amber
Hen harrier	HH	-	-	2	Amber
House sparrow	HS	3	-	-	Amber
Linnet	LI	3	2	-	Amber
Blackbird	B.	-	-	3	Green
Blue tit	BT	-	-	1	Green
Bullfinch	BF	1	-	-	Green

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Coal tit	CT	-	-	12	Green
Common crossbill	CR	2	-	-	Green
Dunnock	D	20	24	3	Green
Fieldfare	FF	-	29	-	Green
Goldfinch	GO	-	-	1	Green
Jack snipe	JS	-	2	1	Green
Lesser redpoll	LR	21	35	3	Green
Mistle thrush	M.	-	1	4	Green
Reed bunting	RB	15	9	2	Green
Robin	R.	-	-	12	Green
Song thrush	ST	11	4	9	Green
Sparrowhawk	SH	1	-	1	Green
Stonechat	SC	-	-	1	Green
Woodpigeon	WP	-	-	2	Green
Wren	WR	-	-	10	Green

Table XI.3: Summary of all bird survey results carried out during the 2023-24 non-breeding season

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Grey wagtail	GL	1	1	-	Red
Kestrel	K.	1	1	1	Red
Meadow pipit	MP	56	57	16	Red
Redwing	RE	1	-	-	Red
Snipe	SN	15	17	11	Red
Woodcock	WK	-	3	4	Red
Goldcrest	GC	78	-	5	Amber
Mallard	MA	-	-	2	Amber
Teal	T.	-	5	-	Amber
Blackbird	B.	9	-	16	Green
Blue tit	BT	8	-	7	Green
Bullfinch	BF	-	3	-	Green
Chaffinch	CH	30	-	4	Green
Chiffchaff	CC	1	-	-	Green
Coal tit	CT	53	-	1	Green
Common crossbill	CR	24	5	-	Green
Dunnock	D.	20	20	13	Green
Feral pigeon	FP	-	-	30	Green
Goldfinch	GO	4	-	-	Green
Hooded (grey) crow	HC	-	-	2	Green
Jack snipe	JS	1	-	-	Green
Jackdaw	JD	-	-	9	Green
Lesser redpoll	LR	94	21	-	Green
Long-tailed tit	LT	25	-	-	Green
Magpie	MG	-	-	3	Green
Mistle thrush	M.	-	2	-	Green

Species	BTO code	Visit 1	Visit 2	Visit 3	BoCCI 2020-2026
Moorhen	MH	-	-	1	Green
Pied wagtail	PW	1	-	-	Green
Raven	RN	-	-	6	Green
Reed bunting	RB	16	24	9	Green
Robin	R.	55	-	28	Green
Siskin	SK	121	-	-	Green
Song thrush	ST	5	8	1	Green
Sparrowhawk	SH	2	1	-	Green
Stonechat	SC	10	-	-	Green
Treecreeper	TC	2	-	-	Green
Wren	WR	53	-	16	Green

Appendix XII – Bioacoustic recordings

Table XII.1: Target species bioacoustic recordings during Year 2 2023 spring passage season and Year 3 2024 spring passage season

Year	Date	Time (Hour)	Time (Mins:Secs)	BTO code
2023	13/03/2023	21	14:22.4	SN
2023	13/03/2023	21	14:20.9	SN
2023	13/03/2023	21	14:37.9	SN
2023	13/03/2023	21	14:23.1	SN
2023	13/03/2023	21	14:21.4	SN
2023	13/03/2023	19	15:56.5	SN
2023	13/03/2023	21	14:24.1	SN
2023	13/03/2023	21	22:27.4	SN
2023	13/03/2023	21	14:20.1	SN
2023	13/03/2023	21	14:25.0	SN
2023	13/03/2023	21	22:31.3	SN
2023	13/03/2023	21	22:29.7	SN
2023	13/03/2023	21	14:09.8	SN
2023	13/03/2023	19	46:55.4	CU
2023	13/03/2023	19	44:50.1	CU
2023	13/03/2023	19	26:00.8	SN
2023	13/03/2023	19	21:35.6	SN
2023	14/03/2023	19	14:53.3	SN
2023	14/03/2023	6	06:26.0	SN
2023	14/03/2023	19	19:00.3	SN
2023	14/03/2023	19	27:36.1	SN
2023	14/03/2023	20	35:13.7	SN
2023	14/03/2023	6	02:35.7	SN
2023	14/03/2023	22	48:05.0	SN
2023	14/03/2023	6	00:05.3	SN
2023	14/03/2023	6	06:32.6	SN
2023	14/03/2023	6	06:30.3	SN
2023	14/03/2023	6	06:31.5	SN
2023	14/03/2023	22	48:02.4	SN
2023	14/03/2023	22	48:03.3	SN
2023	14/03/2023	20	35:09.9	SN
2023	14/03/2023	6	00:03.2	SN
2023	14/03/2023	6	00:04.0	SN
2023	14/03/2023	20	35:15.5	SN
2023	14/03/2023	22	48:08.0	SN
2023	14/03/2023	19	18:55.8	SN
2023	14/03/2023	6	00:09.9	SN
2023	14/03/2023	19	27:41.4	SN
2023	14/03/2023	6	03:17.3	SN
2023	14/03/2023	6	07:28.2	SN
2023	14/03/2023	6	04:07.0	SN
2023	14/03/2023	6	04:00.6	SN
2023	14/03/2023	6	04:46.1	SN
2023	14/03/2023	6	02:38.7	SN
2023	14/03/2023	21	03:35.1	CU
2023	14/03/2023	20	18:04.6	CU
2023	14/03/2023	19	19:53.0	SN
2023	14/03/2023	6	17:26.7	SN
2023	14/03/2023	6	06:52.6	SN
2023	14/03/2023	6	08:32.0	SN
2023	14/03/2023	6	10:11.0	SN
2023	14/03/2023	6	08:15.8	SN
2023	14/03/2023	19	21:37.8	SN
2023	14/03/2023	6	18:41.7	SN
2023	14/03/2023	6	08:14.7	SN

2023	14/03/2023	6	06:32.6	SN
2023	14/03/2023	19	18:49.4	SN
2023	14/03/2023	19	19:09.1	SN
2023	14/03/2023	6	15:23.2	SN
2023	14/03/2023	6	11:26.5	SN
2023	14/03/2023	19	25:02.3	SN
2023	14/03/2023	19	21:51.8	SN
2023	14/03/2023	19	23:47.9	SN
2023	14/03/2023	6	01:28.2	SN
2023	14/03/2023	6	05:33.3	SN
2023	14/03/2023	19	27:30.0	SN
2023	14/03/2023	19	17:42.6	SN
2023	14/03/2023	19	21:15.5	SN
2023	15/03/2023	5	43:39.2	SN
2023	15/03/2023	19	15:06.4	SN
2023	15/03/2023	4	48:41.3	SN
2023	15/03/2023	5	43:40.1	SN
2023	15/03/2023	5	43:33.3	SN
2023	15/03/2023	4	48:39.1	SN
2023	15/03/2023	6	05:52.5	SN
2023	15/03/2023	5	43:34.8	SN
2023	15/03/2023	5	43:32.5	SN
2023	15/03/2023	19	56:02.6	SN
2023	15/03/2023	5	58:27.5	SN
2023	15/03/2023	5	43:31.8	SN
2023	15/03/2023	19	15:04.1	SN
2023	15/03/2023	5	43:44.8	SN
2023	15/03/2023	5	43:41.7	SN
2023	15/03/2023	6	05:53.8	SN
2023	15/03/2023	19	56:03.3	SN
2023	15/03/2023	19	56:10.2	SN
2023	15/03/2023	19	11:26.3	SN
2023	15/03/2023	2	00:06.1	MH
2023	15/03/2023	19	18:57.8	SN
2023	15/03/2023	6	13:42.7	SN
2023	15/03/2023	6	00:22.7	SN
2023	15/03/2023	6	06:16.3	SN
2023	15/03/2023	6	00:15.0	SN
2023	15/03/2023	6	02:34.2	SN
2023	15/03/2023	6	04:40.7	SN
2023	15/03/2023	6	06:36.3	SN
2023	16/03/2023	23	34:28.3	SN
2023	16/03/2023	23	34:27.4	SN
2023	16/03/2023	23	34:26.6	SN
2023	16/03/2023	19	55:29.4	SN
2023	16/03/2023	20	04:30.5	SN
2023	16/03/2023	23	34:34.2	SN
2023	16/03/2023	20	08:38.9	SN
2023	16/03/2023	20	06:53.8	SN
2023	16/03/2023	20	04:33.7	SN
2023	16/03/2023	19	22:37.1	SN
2023	16/03/2023	19	55:28.0	SN
2023	16/03/2023	19	55:24.7	SN
2023	16/03/2023	20	08:41.5	SN
2023	16/03/2023	20	04:51.7	SN
2023	16/03/2023	20	08:40.5	SN
2023	16/03/2023	19	55:34.7	SN
2023	16/03/2023	20	08:38.2	SN
2023	16/03/2023	19	39:30.3	SN
2023	16/03/2023	19	37:22.6	SN
2023	16/03/2023	20	06:54.7	SN
2023	16/03/2023	20	08:37.4	SN
2023	16/03/2023	19	39:32.9	SN
2023	16/03/2023	20	04:40.6	SN
2023	16/03/2023	20	04:54.4	SN

2023	16/03/2023	19	31:30.5	SN
2023	16/03/2023	20	06:55.6	SN
2023	16/03/2023	19	37:12.7	SN
2023	16/03/2023	19	39:31.9	SN
2023	16/03/2023	23	34:38.8	SN
2023	16/03/2023	19	27:27.6	CU
2023	16/03/2023	23	34:30.3	SN
2023	16/03/2023	19	37:24.5	SN
2023	16/03/2023	20	08:39.8	SN
2023	16/03/2023	19	37:21.2	SN
2023	16/03/2023	20	11:24.7	CU
2023	16/03/2023	19	32:20.6	CU
2023	16/03/2023	19	28:53.8	CU
2023	16/03/2023	19	57:15.4	CU
2023	16/03/2023	20	22:23.7	CU
2023	16/03/2023	18	19:50.7	SN
2023	16/03/2023	19	24:06.7	SN
2023	16/03/2023	19	27:37.6	SN
2023	17/03/2023	6	03:46.1	SN
2023	17/03/2023	19	22:39.2	SN
2023	17/03/2023	19	27:03.5	SN
2023	17/03/2023	4	06:50.0	SN
2023	17/03/2023	4	06:56.4	SN
2023	17/03/2023	19	25:35.1	SN
2023	17/03/2023	19	26:56.7	SN
2023	17/03/2023	2	39:42.7	CU
2023	17/03/2023	19	27:53.6	SN
2023	17/03/2023	19	47:54.2	SN
2023	17/03/2023	19	16:19.8	SN
2023	17/03/2023	19	19:24.4	SN
2023	17/03/2023	19	17:12.9	SN
2023	17/03/2023	19	21:25.7	SN
2023	17/03/2023	19	16:29.2	SN
2023	17/03/2023	19	16:48.6	SN
2023	17/03/2023	19	19:17.3	SN
2023	17/03/2023	19	19:46.4	SN
2023	17/03/2023	19	45:35.1	SN
2023	17/03/2023	19	41:39.9	SN
2023	17/03/2023	19	18:49.5	SN
2023	17/03/2023	19	18:09.1	SN
2023	17/03/2023	19	23:23.2	SN
2023	17/03/2023	19	53:27.9	SN
2023	17/03/2023	16	36:24.6	SN
2023	17/03/2023	19	22:26.1	SN
2023	17/03/2023	19	41:20.7	SN
2023	17/03/2023	19	44:34.7	SN
2023	17/03/2023	19	40:33.3	SN
2023	17/03/2023	19	17:26.2	SN
2023	17/03/2023	19	53:06.2	SN
2023	17/03/2023	19	17:41.1	SN
2023	17/03/2023	19	20:33.5	SN
2023	17/03/2023	19	25:13.9	SN
2023	17/03/2023	19	47:36.8	SN
2023	17/03/2023	20	00:06.8	SN
2023	17/03/2023	19	54:16.9	SN
2023	17/03/2023	19	28:56.9	SN
2023	17/03/2023	19	38:46.8	SN
2023	17/03/2023	4	40:42.1	SN
2023	17/03/2023	4	40:45.0	SN
2023	17/03/2023	19	40:04.2	SN
2023	18/03/2023	4	09:27.3	SN
2023	18/03/2023	4	09:26.3	SN
2023	18/03/2023	4	09:28.5	SN
2023	18/03/2023	20	11:35.9	SN
2023	18/03/2023	3	42:05.5	SN

2023	18/03/2023	4	09:30.8	SN
2023	18/03/2023	3	39:46.8	SN
2023	18/03/2023	3	38:20.9	SN
2023	18/03/2023	20	11:32.5	SN
2023	18/03/2023	20	11:33.2	SN
2023	18/03/2023	20	11:33.8	SN
2023	18/03/2023	3	42:04.7	SN
2023	18/03/2023	4	09:24.7	SN
2023	18/03/2023	20	11:38.9	SN
2023	18/03/2023	4	09:29.5	SN
2023	18/03/2023	20	11:38.1	SN
2023	18/03/2023	20	11:31.7	SN
2023	18/03/2023	20	11:36.5	SN
2023	18/03/2023	4	09:32.8	SN
2023	18/03/2023	20	11:35.2	SN
2023	18/03/2023	3	42:06.3	SN
2023	18/03/2023	3	39:46.0	SN
2023	18/03/2023	3	38:21.9	SN
2023	18/03/2023	4	09:32.0	SN
2023	18/03/2023	3	42:03.9	SN
2023	18/03/2023	3	42:03.0	SN
2023	18/03/2023	20	11:37.2	SN
2023	18/03/2023	20	11:42.3	SN
2023	18/03/2023	3	38:24.1	SN
2023	18/03/2023	3	39:47.5	SN
2023	18/03/2023	3	42:09.8	SN
2023	18/03/2023	20	11:31.0	SN
2023	18/03/2023	3	39:54.3	SN
2023	18/03/2023	19	45:55.9	CU
2023	18/03/2023	19	29:16.3	SN
2023	18/03/2023	22	28:27.2	SN
2023	18/03/2023	19	51:56.9	SN
2023	19/03/2023	5	47:39.8	SN
2023	19/03/2023	5	40:13.6	SN
2023	19/03/2023	5	40:14.9	SN
2023	19/03/2023	5	38:55.4	SN
2023	19/03/2023	5	40:08.6	SN
2023	19/03/2023	5	40:12.5	SN
2023	19/03/2023	5	38:57.3	SN
2023	19/03/2023	5	38:58.3	SN
2023	19/03/2023	5	38:52.1	SN
2023	19/03/2023	5	47:41.5	SN
2023	19/03/2023	5	40:09.5	SN
2023	19/03/2023	5	49:27.6	SN
2023	19/03/2023	5	40:11.4	SN
2023	19/03/2023	5	52:30.9	SN
2023	19/03/2023	5	47:40.7	SN
2023	19/03/2023	5	52:51.8	SN
2023	19/03/2023	5	38:50.9	SN
2023	19/03/2023	5	47:42.6	SN
2023	19/03/2023	5	38:53.2	SN
2023	19/03/2023	5	38:54.3	SN
2023	19/03/2023	5	38:59.5	SN
2023	19/03/2023	5	53:55.5	SN
2023	19/03/2023	5	38:49.0	SN
2023	19/03/2023	5	54:19.5	SN
2023	19/03/2023	5	55:28.2	SN
2023	19/03/2023	5	36:26.4	CU
2023	19/03/2023	20	19:58.3	SN
2023	19/03/2023	19	33:16.3	SN
2023	19/03/2023	19	53:47.3	CU
2023	19/03/2023	6	04:41.8	SN
2023	19/03/2023	6	05:01.1	SN
2023	19/03/2023	6	06:15.6	SN
2023	19/03/2023	6	06:42.5	SN

2023	19/03/2023	6	02:06.0	SN
2023	19/03/2023	6	02:01.4	SN
2023	19/03/2023	6	04:57.0	SN
2023	19/03/2023	6	01:37.5	SN
2023	19/03/2023	6	00:40.1	SN
2023	19/03/2023	6	04:23.0	SN
2023	19/03/2023	19	19:51.0	SN
2023	19/03/2023	19	22:09.4	SN
2023	19/03/2023	19	23:41.7	SN
2023	19/03/2023	5	31:14.5	SN
2023	20/03/2023	5	56:06.3	SN
2023	20/03/2023	23	36:13.7	SN
2023	20/03/2023	1	08:12.1	SN
2023	20/03/2023	23	36:12.5	SN
2023	20/03/2023	5	56:07.9	SN
2023	20/03/2023	1	08:14.2	SN
2023	20/03/2023	1	08:16.4	SN
2023	20/03/2023	1	08:17.6	SN
2023	20/03/2023	1	08:13.1	SN
2023	20/03/2023	3	14:09.6	SN
2023	20/03/2023	21	35:52.5	SN
2023	20/03/2023	19	10:34.8	SN
2023	20/03/2023	19	32:12.2	SN
2023	20/03/2023	19	16:29.9	SN
2023	21/03/2023	5	42:39.3	SN
2023	21/03/2023	5	21:53.2	SN
2023	21/03/2023	5	42:40.8	SN
2023	21/03/2023	5	42:38.1	SN
2023	21/03/2023	4	10:30.7	SN
2023	21/03/2023	5	33:04.9	SN
2023	21/03/2023	5	33:11.5	SN
2023	21/03/2023	5	33:18.9	SN
2023	21/03/2023	5	50:19.0	SN
2023	21/03/2023	5	33:16.2	SN
2023	21/03/2023	5	33:08.2	SN
2023	21/03/2023	5	06:36.1	SN
2023	21/03/2023	0	27:22.5	SN
2023	21/03/2023	5	33:08.7	SN
2023	21/03/2023	5	21:25.9	SN
2023	21/03/2023	5	33:06.2	SN
2023	21/03/2023	5	33:10.6	SN
2023	21/03/2023	5	00:58.3	SN
2023	21/03/2023	0	45:19.5	SN
2023	21/03/2023	5	31:32.3	SN
2023	21/03/2023	5	30:40.5	SN
2023	21/03/2023	5	36:00.6	SN
2023	21/03/2023	5	33:13.3	SN
2023	21/03/2023	5	34:15.4	SN
2023	21/03/2023	5	29:44.0	SN
2023	21/03/2023	5	21:18.1	SN
2023	21/03/2023	5	20:28.8	SN
2023	21/03/2023	5	19:27.3	SN
2023	21/03/2023	5	12:11.9	SN
2023	21/03/2023	4	10:32.9	SN
2023	21/03/2023	5	27:34.0	T
2023	21/03/2023	5	05:27:32	T
2023	21/03/2023	5	33:09.6	SN
2023	21/03/2023	5	15:11.0	SN
2023	21/03/2023	5	32:57.8	SN
2023	21/03/2023	5	29:28.7	SN
2023	21/03/2023	5	13:53.6	SN
2023	21/03/2023	5	10:27.5	SN
2023	21/03/2023	5	30:54.5	SN
2023	21/03/2023	5	31:39.9	SN
2023	21/03/2023	5	20:20.8	SN

2023	21/03/2023	5	32:54.9	SN
2023	21/03/2023	0	45:18.5	SN
2023	21/03/2023	4	10:39.2	SN
2023	22/03/2023	19	28:44.4	SN
2023	22/03/2023	19	30:57.7	SN
2023	22/03/2023	19	35:31.9	SN
2023	22/03/2023	19	30:59.8	SN
2023	22/03/2023	20	31:20.7	SN
2023	22/03/2023	20	14:34.1	SN
2023	22/03/2023	19	25:45.2	SN
2023	22/03/2023	19	25:23.8	SN
2023	22/03/2023	19	25:40.9	SN
2023	22/03/2023	19	25:22.1	SN
2023	22/03/2023	20	32:57.1	SN
2023	23/03/2023	5	16:53.8	SN
2023	23/03/2023	5	32:10.8	SN
2023	23/03/2023	5	32:11.5	SN
2023	23/03/2023	5	41:39.9	SN
2023	23/03/2023	5	16:58.5	SN
2023	23/03/2023	5	32:12.3	SN
2023	23/03/2023	5	32:12.8	SN
2023	23/03/2023	5	32:13.7	SN
2023	23/03/2023	5	16:59.3	SN
2023	23/03/2023	5	32:17.3	SN
2023	23/03/2023	5	25:03.0	SN
2023	23/03/2023	5	16:57.2	SN
2023	23/03/2023	5	17:00.8	SN
2023	23/03/2023	5	17:55.0	SN
2023	23/03/2023	5	32:05.2	SN
2023	23/03/2023	5	25:02.1	SN
2023	23/03/2023	5	18:07.4	SN
2023	23/03/2023	5	17:04.8	SN
2023	23/03/2023	5	16:55.3	SN
2023	23/03/2023	5	16:53.2	SN
2023	23/03/2023	5	16:56.0	SN
2023	23/03/2023	5	26:16.7	SN
2023	23/03/2023	5	38:59.6	SN
2023	23/03/2023	5	15:44.4	CU
2023	23/03/2023	20	16:14.4	CU
2023	23/03/2023	19	40:42.7	T
2023	23/03/2023	19	34:08.4	SN
2023	24/03/2023	5	33:51.5	SN
2023	24/03/2023	21	10:41.9	SN
2023	24/03/2023	19	54:52.9	SN
2023	24/03/2023	3	24:51.9	SN
2023	24/03/2023	21	10:55.7	SN
2023	24/03/2023	5	33:55.3	SN
2023	24/03/2023	19	54:54.9	SN
2023	24/03/2023	21	10:58.2	SN
2023	24/03/2023	21	10:54.3	SN
2023	24/03/2023	19	59:18.8	SN
2023	24/03/2023	5	33:59.3	SN
2023	24/03/2023	3	24:54.6	SN
2023	24/03/2023	3	24:53.9	SN
2023	24/03/2023	23	18:30.3	CU
2023	24/03/2023	18	46:43.0	CU
2023	24/03/2023	19	49:53.2	SN
2023	24/03/2023	19	50:33.5	SN
2023	24/03/2023	0	18:39.0	T
2023	24/03/2023	19	49:03.9	SN
2023	24/03/2023	19	33:47.0	SN
2023	24/03/2023	19	58:03.0	SN
2023	24/03/2023	20	00:13.4	SN
2023	24/03/2023	19	39:22.0	SN
2023	24/03/2023	19	39:24.9	SN

2023	24/03/2023	19	59:54.0	SN
2023	25/03/2023	5	23:56.2	SN
2023	25/03/2023	5	23:57.8	SN
2023	25/03/2023	5	13:32.4	SN
2023	25/03/2023	5	05:12:34	SN
2023	25/03/2023	5	24:31.1	SN
2023	25/03/2023	19	38:48.2	SN
2023	25/03/2023	5	13:35.2	SN
2023	25/03/2023	5	13:32.9	SN
2023	25/03/2023	2	16:20.3	SN
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2023	25/03/2023	5	13:34.2	SN
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2023	25/03/2023	5	20:19.3	SN
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2023	25/03/2023	21	53:32.1	SN
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2023	26/03/2023	20	12:00.4	SN
2023	26/03/2023	19	40:42.8	SN
2023	26/03/2023	19	52:51.5	SN
2023	26/03/2023	5	11:39.5	SN

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2023	26/03/2023	5	47:10.4	SN
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2023	30/03/2023	22	44:14.5	SN
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2023	01/04/2023	23	02:09.5	SN
2023	01/04/2023	4	22:05.8	SN
2023	01/04/2023	21	23:25.0	SN
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2023	01/04/2023	21	22:43.0	SN
2023	01/04/2023	23	04:08.0	SN
2023	01/04/2023	23	05:44.5	SN
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2023	02/04/2023	2	10:07.3	SN
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2023	02/04/2023	20	56:29.8	SN
2023	02/04/2023	21	07:19.5	SN
2023	02/04/2023	6	03:46.4	SN
2023	02/04/2023	2	10:29.0	SN

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2023	02/04/2023	0	19:00.7	SN
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2023	03/04/2023	0	25:15.9	SN
2023	03/04/2023	0	27:34.9	SN
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2023	03/04/2023	20	48:02.1	SN
2023	03/04/2023	0	32:38.2	SN
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2023	03/04/2023	1	35:05.6	SN
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2023	03/04/2023	21	57:05.6	SN
2023	03/04/2023	21	52:54.4	SN
2023	03/04/2023	22	01:19.3	SN
2023	03/04/2023	22	02:08.4	SN
2023	03/04/2023	21	49:16.9	SN
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2023	03/04/2023	22	34:59.2	SN
2023	03/04/2023	0	08:28.5	SN
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2023	04/04/2023	21	04:18.1	SN
2023	05/04/2023	23	55:08.3	SN
2023	05/04/2023	23	01:20.5	SN
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2023	05/04/2023	3	56:36.6	SN
2023	05/04/2023	20	59:12.6	SN
2023	05/04/2023	21	02:11.5	SN
2023	05/04/2023	3	56:41.6	SN
2023	05/04/2023	5	58:54.2	SN
2023	05/04/2023	3	56:47.7	SN
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2023	05/04/2023	23	40:37.5	SN
2023	05/04/2023	23	35:38.4	SN
2023	05/04/2023	23	35:32.7	SN
2023	05/04/2023	23	34:23.2	SN

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2023	05/04/2023	23	36:37.0	SN
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2023	05/04/2023	22	15:45.6	SN
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2023	06/04/2023	22	12:47.6	SN
2023	06/04/2023	21	20:42.1	SN
2023	06/04/2023	21	28:54.0	SN
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2023	06/04/2023	1	30:16.7	SN
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2023	06/04/2023	22	12:18.4	WG
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2023	06/04/2023	4	31:39.2	SN
2023	06/04/2023	2	10:48.2	SN
2023	06/04/2023	2	07:40.3	SN
2023	06/04/2023	3	51:45.0	SN

2023	06/04/2023	4	23:59.5	SN
2023	06/04/2023	3	42:24.8	SN
2023	06/04/2023	4	28:36.4	SN
2023	06/04/2023	4	33:37.6	SN
2023	06/04/2023	1	48:55.4	SN
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2023	06/04/2023	0	55:32.3	SN
2023	06/04/2023	0	53:37.7	SN
2023	06/04/2023	1	01:07.5	SN
2023	06/04/2023	6	05:40.9	SN
2023	06/04/2023	4	36:44.7	SN
2023	06/04/2023	4	35:22.6	SN
2023	06/04/2023	23	57:48.5	SN
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2023	06/04/2023	5	41:19.8	SN
2023	06/04/2023	4	20:53.9	SN
2023	06/04/2023	4	35:09.7	SN
2023	06/04/2023	22	47:30.2	SN

2023	06/04/2023	4	35:01.1	SN
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2023	06/04/2023	23	51:44.7	SN
2023	06/04/2023	5	07:54.7	SN
2023	06/04/2023	6	05:33.9	SN
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2023	06/04/2023	0	45:08.4	SN
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2023	06/04/2023	22	10:56.1	WG
2023	06/04/2023	1	31:01.7	SN
2023	06/04/2023	2	58:02.2	SN
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2023	06/04/2023	3	27:38.5	SN
2023	06/04/2023	3	27:42.6	SN
2023	06/04/2023	5	08:14.2	SN
2023	06/04/2023	4	01:20.6	SN

2023	07/04/2023	0	15:35.9	SN
2023	07/04/2023	0	15:35.3	SN
2023	07/04/2023	23	41:16.4	SN
2023	07/04/2023	0	15:33.1	SN
2023	07/04/2023	0	15:32.4	SN
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2023	07/04/2023	21	24:46.2	SN
2023	07/04/2023	0	14:28.5	SN
2023	07/04/2023	0	28:06.8	SN
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2023	07/04/2023	2	31:44.4	SN
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2023	08/04/2023	4	16:40.2	SN
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2023	08/04/2023	1	21:08.3	T
2023	08/04/2023	20	58:51.1	SN
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2023	08/04/2023	20	59:44.3	SN
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2023	08/04/2023	20	59:24.9	SN
2023	08/04/2023	21	19:38.2	SN

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2023	08/04/2023	21	19:21.1	SN
2023	09/04/2023	21	27:40.2	SN
2023	09/04/2023	21	11:00.6	SN
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2024	27/03/2024	19	37:53.0	SN
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2024	27/03/2024	22	53:36.8	CU
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2024	28/03/2024	5	29:51.6	CU
2024	28/03/2024	5	32:14.9	CU
2024	28/03/2024	21	54:14.8	CU
2024	28/03/2024	5	29:21.6	CU

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2024	28/03/2024	0	51:08.1	CU
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2024	28/03/2024	19	50:40.8	SN
2024	29/03/2024	5	59:03.0	MH
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2024	29/03/2024	6	07:20.3	CU
2024	29/03/2024	20	06:23.9	CU
2024	29/03/2024	22	25:20.0	CU
2024	29/03/2024	21	10:56.0	CU
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2024	29/03/2024	23	01:38.7	CU
2024	29/03/2024	20	10:28.0	CU
2024	29/03/2024	23	01:13.4	CU
2024	29/03/2024	21	08:58.6	CU
2024	29/03/2024	21	09:10.0	CU
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2024	30/03/2024	6	05:05.7	CU
2024	30/03/2024	0	21:38.1	CU
2024	30/03/2024	3	32:22.0	CU
2024	30/03/2024	3	51:32.3	CU
2024	30/03/2024	0	19:07.6	CU
2024	30/03/2024	0	10:30.7	CU
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2024	30/03/2024	19	53:05.6	SN
2024	30/03/2024	4	55:42.0	SN
2024	30/03/2024	4	55:50.8	SN
2024	30/03/2024	4	53:43.5	SN

2024	31/03/2024	20	00:48.5	SN
2024	31/03/2024	20	00:50.6	SN
2024	31/03/2024	21	09:25.7	SN
2024	31/03/2024	19	59:22.6	SN
2024	31/03/2024	20	00:43.9	SN
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2024	03/04/2024	22	53:55.8	CU
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2024	04/04/2024	1	31:41.4	CU
2024	04/04/2024	0	30:45.6	CU
2024	04/04/2024	1	31:50.5	CU
2024	04/04/2024	1	30:44.0	CU

2024	04/04/2024	0	32:34.5	CU
2024	04/04/2024	1	31:01.8	CU
2024	04/04/2024	0	32:19.7	CU
2024	04/04/2024	1	31:24.8	CU
2024	04/04/2024	0	30:33.8	CU
2024	04/04/2024	0	31:18.7	CU
2024	04/04/2024	1	31:10.4	CU
2024	05/04/2024	0	31:47.1	CU
2024	05/04/2024	0	31:21.7	CU
2024	05/04/2024	0	31:17.1	CU
2024	05/04/2024	0	32:13.7	CU
2024	05/04/2024	0	31:12.7	CU
2024	05/04/2024	0	30:10.1	CU
2024	06/04/2024	2	36:13.2	CU
2024	06/04/2024	2	35:45.9	CU
2024	06/04/2024	3	11:55.5	CU
2024	08/04/2024	20	54:23.9	SN
2024	08/04/2024	20	54:21.8	SN
2024	08/04/2024	20	54:18.8	SN
2024	08/04/2024	20	54:18.3	SN
2024	08/04/2024	20	54:21.1	SN
2024	08/04/2024	4	40:05.1	SN
2024	08/04/2024	3	39:53.5	CU
2024	08/04/2024	20	01:16.9	SN
2024	08/04/2024	20	19:33.0	SN
2024	08/04/2024	20	15:19.3	SN
2024	08/04/2024	20	19:12.9	SN
2024	08/04/2024	20	19:59.0	SN
2024	08/04/2024	20	17:16.6	SN
2024	08/04/2024	20	19:14.4	SN
2024	08/04/2024	20	18:42.6	SN
2024	08/04/2024	20	13:16.1	SN
2024	08/04/2024	20	20:40.4	SN
2024	08/04/2024	20	16:01.0	SN
2024	08/04/2024	20	20:59.4	SN
2024	08/04/2024	20	15:38.4	SN
2024	08/04/2024	20	12:30.7	SN
2024	08/04/2024	20	19:57.5	SN
2024	08/04/2024	20	20:38.7	SN
2024	08/04/2024	20	20:00.4	SN
2024	08/04/2024	20	15:41.6	SN
2024	08/04/2024	20	13:37.5	SN
2024	08/04/2024	20	19:35.9	SN
2024	08/04/2024	20	13:38.9	SN
2024	08/04/2024	20	04:26.1	SN
2024	08/04/2024	20	04:41.8	SN
2024	09/04/2024	20	13:56.0	SN
2024	09/04/2024	20	14:00.9	SN
2024	09/04/2024	20	13:59.2	SN
2024	09/04/2024	20	13:58.0	SN
2024	09/04/2024	19	42:36.0	CU
2024	09/04/2024	20	58:25.3	CU
2024	09/04/2024	19	44:01.9	CU
2024	09/04/2024	20	56:10.7	CU
2024	09/04/2024	20	32:27.6	SN
2024	09/04/2024	20	57:30.5	CU
2024	09/04/2024	20	57:16.3	CU
2024	09/04/2024	20	56:52.8	CU
2024	09/04/2024	5	04:22.7	SN
2024	10/04/2024	0	43:58.5	SN
2024	10/04/2024	0	43:59.2	SN
2024	12/04/2024	20	23:02.4	SN